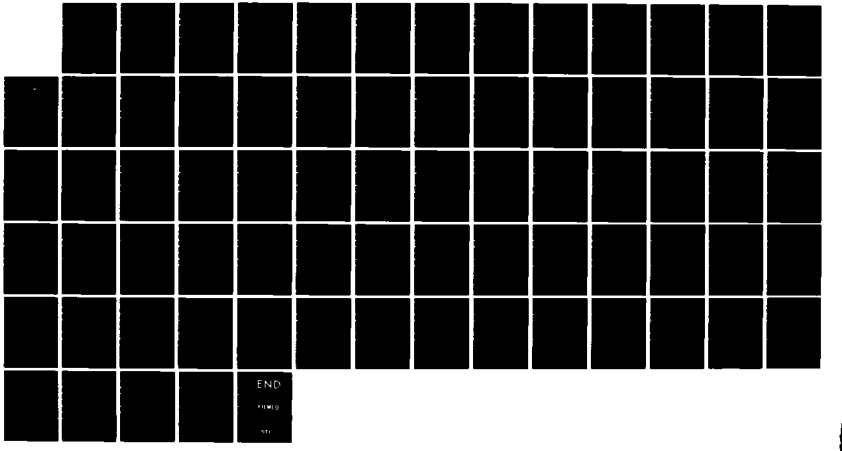
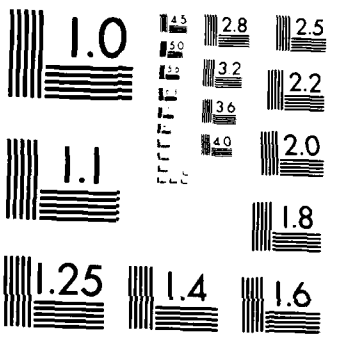
AD-A156 893 F-16X MSIP (MULTI-NATIONAL STAGED IMPROVEMENT PROGRAM) 1/1
CASE EXAMPLE: OPER..(U) INFORMATION SPECTRUM INC
ARLINGTON VA W C REDEEN 17 AUG 84 ISI-V-4859-02
UNCLASSIFIED F33600-82-C-0543 F/G 5/1 NL





MICROCOPY RESOLUTION TEST CHART

INFORMATION SPECTRUM, INC.
1745 S. JEFFERSON DAVIS HIGHWAY, ARLINGTON, VIRGINIA 22202 (703) 892-9000

(2)

FINAL
F-16X MSIP Case Example:
Operating & Support Cost Estimation
Using VAMOSC

Contract: F33600-82-C-0543/P00005
CDRL Item No: A018
ISI Report No: V-4859-02
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FORWARD

This case example of a hypothetical F-16X MSIP (Multi-National Staged Improvement Program) Operating and Support (O&S) cost estimate, sponsored by AFLC/MM (VAMOSC), has been prepared to demonstrate and test the capability of the Air Force Visibility and Management of Operating and Support Costs (VAMOSC) system to provide unique and detailed experience data suitable for credible and explicit O&S cost estimation for advanced Air Force aircraft systems and subsystems.

The specific objective of this effort is:

- To produce a case example of VAMOSC applicability to O&S cost estimation which conforms to the following conditions:
  - Is compatible with OSD/CAIG and USAF costing guidance.
  - Is linkable to reported experience data for existing aircraft.
  - Provides a VAMOSC-Supported Methodology which can be utilized to predict the impact of configuration changes on system O&S costs.
  - Depicts a methodology which is applicable to O&S costing for any aircraft system in advanced conceptual development.
  - Provides estimates which are verifiable by tests.
  - Identifies areas of VAMOSC requiring enhancement or modification to improve system integrity and applicability.

The Air Force VAMOSC system was developed to enhance O&S cost estimation and assessments in all areas of systems acquisition and logistics management. The detailed O&S cost experience data now becoming available in the Component Support Cost System (CSCS) and Weapon System Support Costs (WSSC) will support innovative and explicit O&S cost estimation at all stages of the

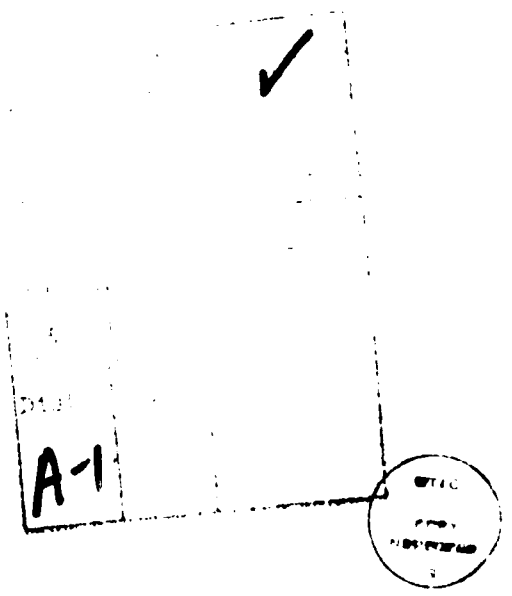
life cycle. The case example estimate of the F-16X MSIP documented in this report has been prepared to illustrate that VAMOSC reports can provide highly credible, explicit experience data for existing Air Force Aircraft; and furthermore, that this data can be the basis of engineering analyses, including "bottoms-up" cost estimating and can offer explicit traceability from the existing aircraft data to the aircraft variant.

The estimate of the F-16X MSIP aircraft developed by this research effort is not intended to reflect an actual projection of that conceptual aircraft system's O&S cost. Such a projection would require direct engineering support and analysis, including an engineering-oriented interpretation of each candidate design change from the benchmark system (F-16A), and specific review of data provided in VAMOSC reports and their feeder systems. Therefore, the cost factors and estimates should be taken as indicators of how estimates can be prepared and reported, and should not be presumed to be valid estimates for any F-16 MSIP variant aircraft.

Our utilization of VAMOSC formats in preparation of this report verified its potential benefits as the basis of producing high quality O&S cost estimates. While there were many data fields not yet loaded, our research identified that the Office of VAMOSC is fully committed to resolving the problems uncovered by this study. In fact, the solutions to many of the perceived problems have been identified and at this point are waiting for software to be programmed and for the software configuration of VAMOSC to be updated.

However, in the near term, the user should consult with the Office of VAMOSC when requesting data to ascertain whether a specific problem exists, and if so, to establish whether the potential fix has been identified.

This case example will assist the cost analyst in the preparation of cost estimating reports submitted to the AFSARC and the Office of the Secretary of Defense/Cost Analysis Improvement Group (OSD/CAIG). The estimate has been developed and documented to be totally consistent with the format in the guidance issued by the CAIG for systems proceeding into the Milestone I phase of systems acquisition. Section 1 outlines the characteristics of the aircraft variant, and presents the summary cost estimates and comparative cost data. Section 2 discusses analysis assumptions and ground rules. Section 3 outlines the analysis methodology, along with data sources and scalar derivation. Section 4 presents cost sensitivity needs and Appendix A addresses the projection of squadron manning changes. Appendix B lists all prospective modifications, and Appendices C and D display all cost element calculations.



EXECUTIVE SUMMARY

Operating and Support (O&S) costs for the F-16X MSIP and the current F-16A are shown below.

F-16A to F-16X MSIP O&S COST COMPARISON - AFSARC I
FY84$ - Millions, 24 PAA/Sqdn, 561 Total PAA

	F-16A	F-16X MSIP
$/Acft/yr	1.45	1.56
$/Sqdn/yr	34.88	37.52
15 yr Force O&S	9,245.25	9,941.42

The force O&S costs are based on a five year delivery schedule plus ten years of full force operations . . .

The cost growth reflected in the F-16X MSIP is due primarily to the incorporation of several new subsystems . . . In particular, the addition of Low Altitude Targeting Infra-Red for Night (LANTIRN) is estimated to increase O&S costs by $653,200 per squadron per year, or by 1.9%. Other significant modifications include the Precision Location Strike System (PLSS), the AN/APG-68 Fire Control Radar, and the GPU-5A 30MM Gun Pod. These three increase O&S costs by .70%, .73%, and .87%, respectively. F-16X MSIP costs are projected to be greater than the F-16A baseline costs due to the addition of 11 maintenance technicians per squadron and additional repair material costs which are required to support the new subsystems . . .

Although the capability of the aircraft will increase dramatically, O&S costs will only increase by 8%. This is due to the increased reliability and maintainability associated with VHSIC incorporation, increased utilization of built-in test (BIT), fiber optics, and . . .

Note: The cost information presented above is hypothetical, and should not be construed as representing actual F-16 costs.

GUIDANCE: THE EXECUTIVE SUMMARY IS A SIMPLE ONE PAGE NARRATIVE PROVIDING THE BOTTOM LINE COSTS, FORCE SIZE, MAJOR COSTS DRIVERS, AND ASSUMPTIONS. INCLUDE A BRIEF EXPLANATION OF DIFFERENCES PREDICTED BETWEEN BASE-LINE SYSTEM AND THE NEW SYSTEM.

CONTENTS

CONTENTS (continued)

NOTE: Lighting bolts applied to tables in this report denote that the data represented is hypothetical.

CONTENTS (continued)

I. INTRODUCTION

This Operating and Support (O&S) cost analysis report is submitted in support of the Air Force Acquisition Review Council (AFSARC) Milestone I review of the F-16X Multi-National Staged Improvement Program (MSIP) . . . All values included in this report are in FY84 dollars unless indicated otherwise . . .

GUIDANCE: IDENTIFY THE MILESTONE, JUSTIFICATION OF MAJOR SYSTEM NEW START (JMSNS), AND SYSTEM CONCEPT PAPER (SCP) WITH DATE AND THE BASE YEAR FOR COSTS IN THE INTRODUCTION.

The F-16X MSIP program is intended to enhance the performance capabilities of the F-16 series of aircraft through the addition of new systems and the alteration of existing systems. Although the current F-16A is a highly capable aircraft, JMSNS threat analyses have identified specific capabilities which must be incorporated if the F-16 is to continue to perform its multi-role mission while surviving in the air defense environment of the 1990's . . .

GUIDANCE: INCLUDE A SHORT STATEMENT SUMMARIZING THE JMSNS/SCP AND ANY SIGNIFICANT DEVIATIONS THAT THE COST ANALYSIS MAKES FROM THE DOCUMENTS.

The MSIP can generally be categorized as approaching full-scale development. The diverse levels of technological maturity of the prospective modifications make classification of a stage of development possible only at the individual modification level. Some are currently being incorporated, while others are scheduled for Initial Operational Capability (IOC) in the 1990s . . .

There are 107 modifications detailed in a recent F-16 Master Modification Plan. The major configuration changes contemplated involve incorporation of the following:

- Expanded Capacity Fire Control Computer
- Advanced Central Interface Unit (ACIU)
- Upfront Communications, Navigation & Identification (UFCNI)
- Data Transfer Unit (DTU)
- AN/APG-68
- Low Altitude Navigation and Targeting Infra-Red for Night (LANTIRN) Pod
- Advanced Medium Range Air-to-Air Missile (AMRAAM)
- Airborne Self-Protection Jammer (ASPJ) Integration
- ALR-74 Radar Homing and Warning (RHAW) Set
- NAVSTAR/Global Positioning System (GPS)
- Joint Tactical Information Distribution System (JTIDS)
- Precision Location Strike System (PLSS)
- GPU-5A 30MM Gun Pod
- EJS (Anti-Jam Communications)
- Direct Power Source for Flight Control System (FCS)

GUIDANCE: ALSO, OUTLINE THE MODIFICATION PROGRAM, ITS STAGE OF DEVELOPMENT, MAJOR SYSTEM PARAMETERS, AND MAJOR POTENTIAL RISKS THAT IMPACT OPERATING AND SUPPORT (O&S) COSTS.

A diagram of the F-16 series is presented in Figure 1.

The flying hour program is 305 Flight Hours per Primary Aircraft Authorized per Year (FH/PAA/YR) for operational aircraft.

3. METHODOLOGY

3.1 General

This analysis utilizes the Visibility and Maintenance of Operating and Support Costs (VAMOSC) Component Support Cost System (CSCS) to quantify the O&S cost impact of the significant F-16X modifications, through the development of like/similar (L/S) relationships which were scaled to account for physical, reliability, technological, and operational differences . . .

GUIDANCE: HIGHLY DETAILED ESTIMATES OF OPERATING AND SUPPORT COST IMPACTS OF CONFIGURATION MODIFICATIONS CAN BE PREPARED USING THE HISTORICAL DATA AVAILABLE IN VAMOSC, COMBINED WITH ENGINEERING ESTIMATES. ANALYSIS STEPS ARE SHOWN IN FIGURE 2 BELOW.

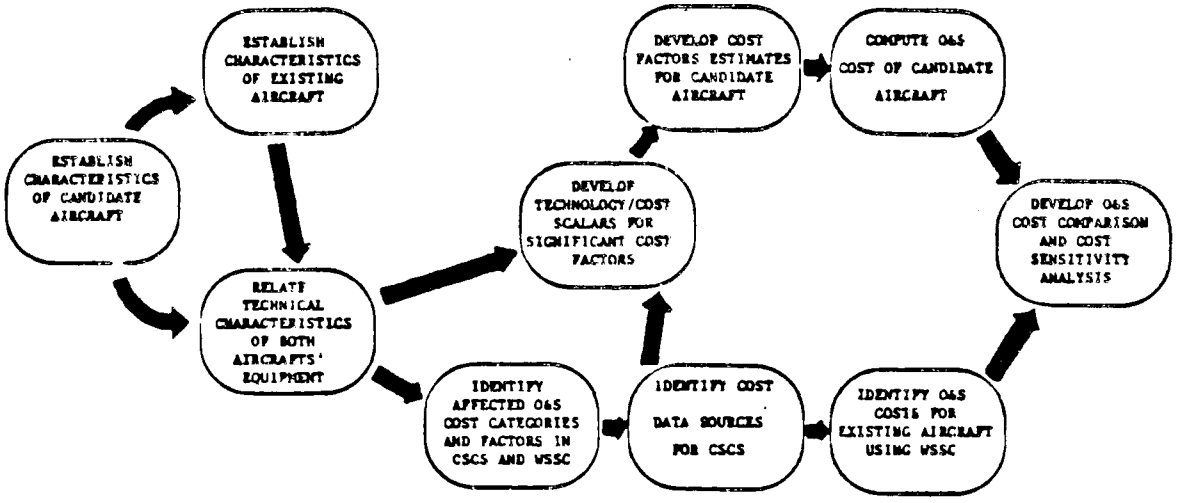


FIGURE 2. ANALYSIS APPROACH FLOWCHART

GUIDANCE: HIGHLIGHT IN A TABLE THOSE VALUES WHICH DESCRIBE THE OPERATIONAL SCENARIO OF THE SYSTEM. A BRIEF EXPLANATION AND DERIVATION OF THE VALUE SHOULD BE PRESENTED FOLLOWING THE TABLE.

2.4.3 Standard Values and Rates

Table 9 lists the standard values and rates used and the source.

TABLE 9. STANDARD VALUES AND RATES

Elements	Value	Source
1. POL Cost per Gallon	$1.00/Gal.	AFR173-13 Table 2-6
2. Officer Composite Rate ($/officer/Yr.)	$35,573	AFR173-13 Table 3-4 or VAMOSC WSSC
3. Enlisted Composite Rate ($/Enlisted/Yr.)	$17,711	AFR173-13 Table 3-4 or VAMOSC WSSC
4. Civilian Comp. Rate ($/Civilian/Yr.)	$26,491	AFR173-13 Table 3-10 or VAMOSC WSSC
5. Aircraft Svc. Life	15 years or 6000 Flt Hours	AFR173-13 Paragraph 1-8
6. Base Year Dollars	FY 84	-
7. Escalation Factors	Variable by cost element	AFR173-13 Table 5-1

GUIDANCE: HIGHLIGHT IN A TABLE THOSE STANDARD VALUES WHICH ARE ESTABLISHED AND GENERALLY ACCEPTED. THESE VALUES ARE NOT SUBJECT TO INFLUENCE BY THE SYSTEM UNDER CONSIDERATION OR THE USING COMMAND.

2.4.2 System Operational Standards

Table 8 identifies the values used in this analysis which reflect current Air Force policy . . .

TABLE 8. SYSTEM OPERATIONAL STANDARDS

	Elements	Value	Source
1.	Average Utilization Rate	25.4 FH/MO	VAMOSC WSSC (RPT# AR8103)
2.	Aircraft Per Sqdn	24	AFR173-13 Table 4-6
3.	Attrition Rate	6.294/100K FH	AFR173-13 Table 6-2
4.	Crew Ratio	1.31	AFR173-13 Table 4-6

2.4.2.1 Utilization Rate

The F-16X MSIP will require the same number of flying hours as the F-16A to support proficiency. Consequently, the F-16A utilization rate of 25.4 hours/month will serve . . .

2.4.2.2 Aircraft Per Squadron

Although early F-16A squadrons are equipped with 18 PAA, future squadrons will be provided with 24 PAA . . .

2.4.2.3 Attrition Rate . . .

2.4.2.4 Crew Ratio . . .

The F-16X MSIP aircraft will be an all-weather, day/night system. In order to support this multi-role weapon system, it will require a crew ratio of . . .

2.4 Assumptions, Model Inputs, and Rates

2.4.1 Design Sensitive Values

Table 7 lists the elements that are design related . . .

TABLE 7. DESIGN SENSITIVE VALUES - F-16X MSIP

Parameter	Value	Source
1. Flyaway Cost	$10.8M	Contract/SPO Estimate
2. Empty Weight	XXX lbs.	SPO Estimate
3. Fuel Consumption	XXXGPH	Contract/SPO Engineering Estimate
4. MFHBF	3.36	VAMOSC CSCS (See Table 14)
5. Avionics Weight	3,400 lbs.	Contractor/SPO Estimate

2.4.1.1 Flyaway Cost

Unit flyaway cost is projected to be $10.8 million, based on contract data obtained from the F-16 System Program Office . . .

2.4.1.2 Empty Weight . . .

2.4.1.5 . . .

GUIDANCE: TABLE 7 SHOULD CONTAIN SYSTEM PARAMETERS WHICH ARE INHERENT TO THE SYSTEM DESIGN AND ARE DEPENDENT ON HARDWARE CONFIGURATION. FOLLOWING THIS TABLE PROVIDE A BRIEF EXPLANATION OF THE DERIVATION OF THE VALUE SELECTED FOR THE PARAMETER.

TABLE 6. F-16X MSIP SIGNIFICANT MODIFICATION LIST

GUIDANCE: LIST ONLY SIGNIFICANT COST DRIVER MODIFICATIONS WHICH WILL BE SUBJECT TO FULL ANALYSIS. JUSTIFY SELECTION AS SIGNIFICANT MODIFICATION. LIST REMAINING MODIFICATIONS IN AN APPENDIX.

WUC	MOD #	DESCRIPTION	SELECTION RATIONALE
42DE0	0822	Provide Direct Power for Flight Control System	Major New Component addition of new generator expected to increase POL, Component Repair & Replacement Spares Cost due to higher parasitic power requirements and additional failures.
63B00	CCP-9149	Joint Tactical Information Distribution System (JTIDS)	Major New Avionics System. Additional materiel and labor cost.
63X00	PENDING	EJS (Anti-Jam UHF) Communications	Major New Avionics System. Additional materiel and labor cost.
65X00	CCP-9101F	Upfront Communications,Navigation and Identification	Major New Avionics System. Additional materiel and labor cost.
71000	CCP-9145	Global Positioning System	Major New Avionics System. Additional materiel and labor cost.
71X00	CCP-9101F	Upfront Communications Navigation and Identification (NAV Component)	Major New Avionics System. Additional materiel and labor cost.
74A00	CCP-9101F	AN/APG-68 Fire Control Radar	Major New Functions. AN/APG-68 incorporates additional functions including advanced look-down shoot-down capabilities . . . Replaces AN/APG-66.
74C00	CCP-9101F	Expanded Capacity Fire Control Computer	Additional memory and processing capacity will increase system capability. Additional materiel and labor costs. Replaces current FCC.
74N00	CCP-9101F	Data Transfer Unit	Additional processing capacity. Higher materiel and labor costs.
74N00	CCP-9101F	Low-Altitude Target-Infra-Red for Night (LANTIRN) Pod	Major New Avionics System. Additional materiel and labor costs. Pod configure will increase profile drag, thereby increasing POL costs.
74W00	CCP-5763	Precision Location Strike System (PLSS)	Major New Avionics System. Higher materiel and labor cost. Small radome may increase profile drag, thereby increasing POL costs.
74X00	CCP-9101F	Advanced Central Interface Unit (ACIU)	Additional processing capacity and new functions. Higher materiel costs and labor anticipated, possibility of lower reliability.
75C00	CCP-9140	Advanced Medium Range, Air-to-Air Missile (AMRAAM) Provisions	Additional processing capacity is being incorporated at SMS interface to support AMRAAM. Higher materiel and labor costs.
75X00	PENDING	GPU-5A 30MM Gun Pod	Major new system. Higher materiel and labor costs. Pod configuration will increase POL costs.
75C00	CCP-9142	Airborne Self-Protection Jammer (ASPJ)	Higher jamming power output along with new complex ECM & ECCM components will increase materiel and labor cost. Internal configuration will decrease POL cost over ALQ-131 Jamming Pod.
76E00	CCP-9111	ALR-74 Warning Receiver	Greater complexity of subsystem over ALR-69 will increase failure modes. Higher materiel and labor costs.

2.3 System and Program Characteristics

Table 5 presents aircraft and program characteristics of the baseline and F-16X MSIP aircraft. Table 6 lists those configuration modifications for the F-16X considered significant, as determined from a review of all currently proposed modifications (See Appendix B for a complete listing of scheduled modifications) . . .

GUIDANCE: INCLUDE DETAILS OF THE BASELINE SYSTEM AND THE SYSTEM AFTER MODIFICATION IN TABLE FORM.

TABLE 5. OPERATIONAL/TECHNICAL CHARACTERISTICS

CHARACTERISTICS	F-16A	F-16X MSIP
Length	49.5 ft.	49.5 ft.
Wing Span	32.2 ft.	32.2 ft.
Max Speed (40,000 ft MSL)	MACH 2.0+	MACH 2.0+
Combat Radius (HI-LO-HI Attack Mission)	600 NM+	550 NM+
Thrust to Weight Ratio (22,500 wt.)	1.11 to 1	1.05 to 1
Ferry Range	2100 NM+	1900 NM+
Gross Weight	35400 LBS.	35400 LBS.
Empty Weight	15586 LBS.	18753 LBS.
Engine	F-100 PW200	*F100 PW

*At the time of this analysis, source selection is being made for the F-16X engine. The Pratt-Whitney F-100 PW 220 and the General Electric F110 are being evaluated. For purposes of this report, the F-100 PW 220 is assumed to be the selected engine.

GUIDANCE: LIST GENERAL CHARACTERISTICS, AS WELL AS SENSITIVE DESIGN AND PERFORMANCE CHARACTERISTICS WHICH ARE AFFECTED BY THE MODIFICATION PROGRAM. OFTEN, MODIFICATION PROGRAMS WILL HAVE SEVERAL STAGES, WITH A PHASED INCORPORATION OF MODS OVER A LONG PERIOD. CONSEQUENTLY, SPECIFICALLY DEFINE THE ADDITIONAL SYSTEMS INCORPORATED IN THE NEW AIRCRAFT. IN ADDITION, INCLUDE NON-AIRCRAFT SYSTEMS SUCH AS SIMULATORS, AUTOMATIC TEST EQUIPMENT (ATE) AND SPECIALIZED SUPPORT EQUIPMENT IF THEY SIGNIFICANTLY IMPACT SQUADRON O&S COSTS.

2. ASSUMPTIONS AND GROUND RULES

2.1 General

The avionics maintenance concept of the new F-16X MSIP subsystems will be consistent with current F-16A avionics subsystems. The intermediate level maintenance will consist with LRU and SRU and circuit board removal and replacement. This, along with the adoption of Combat-Oriented Maintenance Organization (COMO) and Combat-Oriented Supply Organization (COSO) will result in a concentration of below-depot avionics maintenance at the intermediate level. Circuit board repair will be conducted at depot circuit board repair facilities, thereby increasing depot avionics materiel and contract cost . . .

GUIDANCE: INCLUDE A GENERAL DESCRIPTION OF SYSTEM HARDWARE AND POLICY CHANGES, AND DISCUSS THEIR ANTICIPATED IMPACTS ON O&S COSTS, INDICATING THE DEGREE OF CONFIDENCE THAT THE CHANGES ARE PRACTICAL AND COST IMPACTS ARE ACCURATE.

2.2 Baseline System

The F-16A was selected as the baseline system, since the F-16X MSIP is essentially an enhanced capability F-16A . . .

GUIDANCE: IDENTIFY THE BASELINE SYSTEM AND EXPLAIN THE RATIONALE USED IN ITS SELECTION.

TABLE 4. F-16X MSIP FORCE OPERATING AND SUPPORT COST ESTIMATE-FISCAL YEAR BREAKOUT (MILLIONS, FY84$)
(561 PAA,305 FH/YR, 15 YRS.)

	A	B	C	D	E	F	G	H
1. Fiscal Year	84	85	86	87	88	89	90-98	TOTAL
2. # of Squadrons	0	3.5	8	13	19	23	23	23
3. Deliveries	3	78	108	116	148	108	0	561
4. Mature Aircraft	1.5	42	135	247	379	507	561	561
5. Unit Operations	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
6. Below Depot Maint.	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
7. Installation Suppt.	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
8. Sustaining Investment	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
9. Depot Maintenance	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
10. General Depot Suppt.	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
11. Depot Installation Sup.	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
12. Medical Care	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
13. PCS	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXXX
14. TOTAL	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	9941.418

GUIDANCE: INCLUDE A FORCE O&S COST ESTIMATE IF THE OBJECTIVE OF THE STUDY IS BUDGETARY IN NATURE. PROPER PREPARATION OF A FORCE O&S COST ESTIMATE REQUIRES INTEGRATION OF A PHASED DELIVERY AND INSTALLATION SCHEDULE, FOR EACH SIGNIFICANT MODIFICATION, IN ADDITION TO A DETERMINATION OF WHAT PERCENT OF THE TOTAL MDS FORCE WILL BE SO EQUIPPED. A FORCE O&S COST ESTIMATE SHOULD BE CALCULATED ON THE BASIS OF THE NUMBER OF OPERATIONAL SQUADRONS. THE PREPARATION OF THE ABOVE IS BEST PERFORMED WITH THE ASSISTANCE OF A COMPUTER SPREADSHEET PROGRAM OR AN INTEGRATED O&S COST MODEL.

IF THE OBJECTIVE OF THE STUDY IS DETERMINED TO BE DESIGN TRADEOFF OR CONFIGURATION ORIENTED, OMIT THE FORCE O&S COST ESTIMATE.

TABLE 3. DETAILED ANNUAL AIRCRAFT OPERATING AND SUPPORT COST ESTIMATE-F-16X
MSIP SQUADRON (MILLIONS, FY84$)
(1 SQUADRON, 24 PAA, 305 FH/PAA)

MDS F-16X MSIP — Average Number of Aircraft 24
FLYING HOURS 7320

DESCRIPTION	DOLLAR COST IN MILLIONS							WORK LOAD		
	A	B	C	D	E	F	G	DISTRIBUTION		
					PAY & ALLOWANCE					
	TOTAL	MATERIEL	CONTRACT	OTHER	OFFICER	AIRMEN	CIVILIAN	OFF	AMN	CIV
1. TOTAL EXPENDITURES	37.525	12.307	4.296	3.074	2.628	12.575	2.645	57	644	23
2. UNIT OPERATIONS	11.503	7.446		.974	1.766	1.213	.104	47	76	9
3. AIRCREW	.794				.794	.000				
4. COMMAND STAFF	3.176	.285		.973	.969	.847	.102	47	50	9
5. OTHER UNIT PERSONNEL	.016	.001		.001	.001	.011	.002	0	1	0
6. SECURITY	.357					.002	.355			
7. POL	6.390	6.390								
8. MUNITIONS TRAINING	.770	.770								
9. BELOW DEPOT MAINTENANCE	12.785	2.591	.086	.494	.328	8.986	.300	10	568	14
10. CHIEF OF MAINTENANCE	1.202	.085	.005	.077	.114	.826	.095	3	45	4
11. AVIONICS MAINTENANCE	.425	.054	.002	.001	.003	.349	.016	0	19	1
12. FIELD MAINTENANCE	.047	.011	.001	.001	.000	.015	.019	0	1	0
13. MUNITIONS/MISL MAINT	.031	.000	.000	.000	.000	.031	.000	0	2	0
14. ORGANIZATIONAL MAINT	.001	.000	.000	.000	.000	.001	.000	0	0	0
15. AIRCRAFT GENERATION SQ	5.003	.922	.028	.092	.106	3.850	.005	4	249	0
16. COMPONENT REPAIR SQ	2.896	.920	.029	.151	.063	1.676	.078	1	107	4
17. EQUIPMENT MAINT SQ	3.180	.599	.021	.172	.060	2.238	.090	2	144	5
18. INSTALLATION SUPPORT	5.488	.752	1.047	.640	.271	1.943	.835			
19. REAL PROPERTY MAINT	2.228	.358	.624	.439	.041	.417	.349			
20. COMMUNICATIONS	.456	.044	.029	.052	.022	.278	.039			
21. BASE OPERATIONS	2.804	.350	.394	.149	.208	1.248	.447			
22. SUSTAINING INVESTMENT	1.113	1.113								
23. REPLACEMENT SPARES	1.113	1.113								
24. MOD KITS/MATERIEL	.000	.000								
25. REPLACEMENT SUPP EQUIP	.000	.000								
26. DEPOT MAINTENANCE	3.983	.226	2.968	.338		.012	.339			
27. PDM/MODIFICATIONS	1.995	.001	1.956	.021		.007	.010			
28. ENGINE MAINTENANCE	1.168	.142	.692	.165		.005	.164			
29. AVIONICS MAINTENANCE	.539	.082	.244	.103		.000	.111			
30. OTHER MAINTENANCE	.281	.102	.076	.049		.000	.054			
31. GENERAL DEPOT SUPPORT	1.148	.052	.102	.028	.034	.018	.908			
32. DEPOT INSTALLATION SUP	.391	.027	.093	.030	.021	.061	.159			
33. REAL PROPERTY MAINT	.183	.014	.079	.013	.001	.019	.057			
34. COMMUNICATIONS	.033	.001	.000	.010	.003	.009	.010			
35. BASE OPERATIONS	.175	.012	.014	.007	.017	.033	.092			
36. MEDICAL CARE	.570			.570						
37. PCS	.550				.208	.342				

Note: See Appendix C for detailed computations of impacted Table 3 cost elements.

TABLE 2. VAMOSC WSSC DETAILED FY83 ANNUAL OPERATING AND SUPPORT COST REPORT-F-16A SQUADRON (MILLIONS, FY84$) (1 SQUADRON, 24PAA, 305FH/PAA/YR)

MDS F-16A
FLYING HOURS 7320

Average Number of Aircraft 24

DESCRIPTION	DOLLAR COST IN MILLIONS							WORK LOAD DISTRIBUTION		
	A	B	C	D	E	F	G			
	TOTAL	MATERIEL	CONTRACT	OTHER	PAY & ALLOWANCE OFFICER	AIRMEN	CIVILIAN	OFF	AMN	CIV
1. TOTAL EXPENDITURES	34.881	10.606	3.961	2.961	2.614	12.301	2.437	57	623	23
2. UNIT OPERATIONS	10.631	6.574		.974	1.766	1.213	.104	47	76	9
3. AIRCREW	.794				.794	.000		21	0	
4. COMMAND STAFF	3.176	.285		.973	.969	.847	.102	26	50	9
5. OTHER UNIT PERSONNEL	.016	.001		.001	.001	.011	.002	0	1	0
6. SECURITY	.357				.002	.355	.000			
7. POL	5.518	5.518								
8. MUNITIONS TRAINING	.770	.770								
9. BELOW DEPOT MAINTENANCE	12.039	2.073	.084	.489	.328	8.765	.300	10	557	14
10. CHIEF OF MAINTENANCE	1.202	.085	.005	.077	.114	.826	.095	3	45	4
11. AVIONICS MAINTENANCE	.303	.030	.002	.001	.003	.251	.016	0	16	1
12. FIELD MAINTENANCE	.046	.011	.001	.001	.000	.015	.019	0	1	0
13. MUNITIONS/MISL MAINT	.031	.000	.000	.000	.000	.031	.000	0	2	0
14. ORGANIZATIONAL MAINT	.001	.000	.000	.000	.000	.001	.000	0	0	0
15. AIRCRAFT GENERATION SQ	4.724	.739	.027	.090	.106	3.757	.005	4	243	0
16. COMPONENT REPAIR SQ	2.551	.610	.028	.148	.068	1.645	.072	1	105	4
17. EQUIPMENT MAINT SQ	3.181	.599	.021	.172	.060	2.238	.090	2	144	5
18. INSTALLATION SUPPORT	5.279	.737	.926	.627	.266	1.905	.818			
19. REAL PROPERTY MAINT	2.184	.351	.612	.430	.040	.409	.342			
20. COMMUNICATIONS	.447	.043	.028	.051	.021	.266	.038			
21. BASE OPERATIONS	2.648	.343	.286	.146	.205	1.230	.438			
22. SUSTAINING INVESTMENT	.891	.891								
23. REPLACEMENT SPARES	.891	.891								
24. MOD KITS/MATERIEL										
25. REPLACEMENT SUPP EQUIP										
26. DEPOT MAINTENANCE	3.571	.260	2.785	.260		.012	.254			
27. PDM/MODIFICATIONS	1.995	.001	1.956	.021		.007	.010			
28. ENGINE MAINTENANCE	1.168	.142	.692	.165		.005	.164			
29. AVIONICS MAINTENANCE	.146	.022	.066	.028		.000	.030			
30. OTHER MAINTENANCE	.262	.095	.071	.046		.000	.050			
31. GENERAL DEPOT SUPPORT	1.019	.047	.082	.025	.031	.016	.818			
32. DEPOT INSTALLATION SUP	.393	.025	.084	.027	.019	.055	.143			
33. REAL PROPERTY MAINT	.165	.013	.071	.012	.031	.017	.051			
34. COMMUNICATIONS	.030	.001	.000	.009	.003	.008	.009			
35. BASE OPERATIONS	.158	.011	.013	.006	.015	.030	.083			
36. MEDICAL CARE	.559			.559						
37. PCS	.539				.204	.335				

Note: All values presented in Table 2 were obtained directly from the VAMOSC WSSC F-16A O&S Cost Report (AR8103), dated 11 APR 1984, after being normalized to a squadron Level.

TABLE 1.A SIGNIFICANT MODIFICATION IMPACT SUMMARY-F-16X MSIP
(1 SQUADRON, 24PAA, 305FH/PAA/YR)
(FY84$)

				A	B BELOW DEPOT MAINT	C	D	E	F	G	H	I	J
	WUC	MOD #	DESCRIPTION	POL		INSTALL. SUPPT.	REPLACE. SPARES	DEPOT MAINT.	GENERAL SUPPT.	DEPOT SUPPT	MEDICAL CARE	PCS	TOTAL
1.	42DE0	0822	Power, PCS	$ 8,700	$26,800	$11,700	$ 5,100	$22,900	$ 6,900	$2,000	$ 600	$ 600	$85,300
2.	63B00	CCP 9149	JTIDS	26,100	40,200	14,600	10,300	29,300	10,700	2,600	800	800	135,400
3.	63X00	PENDING	EJS	8,700	20,900	6,900	5,300	16,900	4,100	1,200	400	400	64,800
4.	65X00	CCP9101F	UFCNI IFF	8,700	33,000	5,900	10,100	11,700	3,400	1,000	300	300	74,400
5.	71D00	CCP 9145	GPS	17,400	36,400	18,600	6,400	34,800	10,900	3,300	1,000	1,000	129,800
6.	71X00	CCP9101F	UFCNI NAV	4,400	19,600	7,700	3,700	14,000	4,300	1,400	400	400	55,900
7.	74A00	CCP9101F	AN/AFG-68	33,900	112,400	16,300	39,200	42,500	11,600	2,900	800	800	260,400
8.	74C00	CCP9101F	EXCAP FCC	8,700	66,900	4,800	25,600	18,400	2,800	900	300	300	128,700
9.	74H00	CCP9101F	DTU	4,400	15,100	6,900	2,800	14,300	4,100	1,200	400	400	49,600
10.	74N00	CCP9101F	LANTIRN	270,300	164,400	44,700	46,800	89,900	24,400	7,900	2,400	2,400	653,200
11.	74X00	CCP9101F	PLSS	122,100	49,800	22,400	22,500	11,200	13,100	4,000	1,200	1,200	247,500
12.	74X00	CCP9101	ACTU	33,900	28,800	12,800	5,800	24,900	7,000	2,300	700	700	116,900
13.	75C00	CCP9140	AMRAAM	61,000	38,300	18,600	7,600	35,000	10,100	3,300	1,000	1,000	175,900
14.	75X00	PENDING	GPU-5A	220,000	38,900	6,900	13,000	18,900	3,800	1,200	400	400	303,500
15.	76C00	CCP-9140	ASPJ	26,200	38,700	4,000	14,300	10,800	2,200	700	200	200	97,300
16.	76E00	CCP-9111	ALR-74	17,400	15,900	6,900	3,100	16,400	3,800	1,200	400	400	65,500
			TOTAL	$871,900	$746,100	$209,700	$221,600	$422,900	$123,200	$37,100	$11,300	$11,300	$2,644,100

GUIDANCE: THE MODIFICATION IMPACT SUMMARY PRESENTS DECISION-MAKERS WITH AN ESTIMATE OF THE O&S COST IMPACT OF EACH MODIFICATION. THIS HIGHLY SIGNIFICANT TOOL IS POSSIBLE BECAUSE OF THE DETAILED COST DATA BECOMING AVAILABLE IN VAMOSC CSCS. THE SUMMATION OF COST ELEMENT IMPACT SHOULD APPROXIMATE THE CHANGE IN COSTS DISPLAYED IN TABLE 1, CHANGE COLUMN. ROUNDING ERRORS WHICH OCCUR DURING THE ALLOCATION CALCULATIONS MAY PRODUCE A SMALL VARIANCE.

Note: See Appendix D for calculations of modification O&S cost impacts as displayed in Table 1-A.

TABLE 1. F-16A & F-16X MSIP O&S COST COMPARISON - AFSARC I

USAF DETAIL FORMAT
(MILLIONS, FY84$)
(1 SQUADRON, 24PAA, 305 FH/PAA/YR)

(SEE TABLES 2 AND 3 FOR A DETAILED BREAKOUT OF EACH COST ELEMENT PRESENTED IN THIS TABLE. THIS ESTIMATE IS HYPOTHETICAL, AND SHOULD NOT BE CONSTRUED AS REPRESENTING ACTUAL F-16 COSTS).

		F-16A	F-16X MSIP	CHANGE	NOTE
1.	TOTAL EXPENDITURES	$34.881	$37.525	+2.644	
2.	UNIT OPERATIONS	10.631	11.503	+.872	
3.	AIRCREW	.794	.794	—	
4.	COMMAND STAFF	3.176	3.176	—	
5.	OTHER UNIT PERSONNEL	.016	.016	—	
6.	SECURITY	.357	.337	—	
7.	POL	5.518	6.390	+.872*	1
8.	MUNITIONS TRAINING	.770	.770	—	
9.	BELOW DEPOT MAINTENANCE	12.039	12.785	+.746*	
10.	CHIEF OF MAINT	1.202	1.202	—	
11.	AVIONICS MAINT	.303	.425	+.122	2
12.	FIELD MAINT	.046	.047	.001	
13.	MUNITIONS/MISSILE MAINT	.031	.031	—	
14.	ORGANIZATIONAL MAINT	.001	.001	—	
15.	AIRCRAFT GENERATION SQ	4.724	5.003	+.279	3
16.	COMPONENT REPAIR SQ	2.551	2.896	+.345	4
17.	EQUIPMENT MAINT SQ	3.181	3.181	—	
18.	INSTALLATION SUPPORT	5.279	5.488	+.209*	
19.	REAL PROPERTY MAINT	2.184	2.228	+.044	
20.	COMMUNICATIONS	.447	.456	+.009	
21.	BASE OPERATIONS	2.648	2.804	+.156	
22.	SUSTAINING INVESTMENT	.891	1.113	+.222	
23.	REPLACEMENT SPARES	.891	1.113	+.222*	5
24.	MOD KITS/MATERIEL	.000	.000	—	
25.	REPLACEMENT SUPP EQUIP	.000	.000	—	
26.	DEPOT MAINTENANCE	3.571	3.983	+.412*	
27.	MODIFICATIONS	1.995	1.995	—	
28.	ENGINE MAINT	1.168	1.168	—	
29.	AVIONICS MAINT	.146	.539	+.393	6
30.	OTHER MAINTENANCE	.262	.281	+.019	
31.	GENERAL DEPOT SUPPORT	1.019	1.142	+.123*	
32.	DEPOT INSTALLATION SUPPORT	.353	.391	+.038*	
33.	REAL PROPERTY MAINTENANCE	.165	.183	+.018	
34.	COMMUNICATIONS	.030	.033	+.003	
35.	BASE OPERATIONS	.158	.175	+.017	
36.	MEDICAL CARE	.559	.570	+.011*	
37.	PCS	.539	.550	+.011*	

*See Table 1 A

Notes on Table 1:

1. POL cost increase is due to projected fuel consumption rate increase of 120 gallons per flight hour, resulting from a weight increase, profile drag increase and greater power consumption. (See Table 2, 3 & Section 5).

2. Below Depot Avionics Maintenance cost increase is due to the addition of three avionics technicians per squadron and higher material costs resulting from the higher unit cost of the new avionics systems. (See Table 2, 3 and Appendix C, Table C-1).

3. Below Depot Aircraft Generation Squadron cost increase is due to the addition of six maintenance technicians and increased material costs. (See Table 2, 3 and Appendix C, Table C-2).

4. Increase in Component Repair Squadron costs is due to the addition of two maintenance technicians and higher materiel costs of the major new avionics systems. (See Table 2, 3 and Appendix C, Table C-3).

5. Increase is due to additional aggregate spares requirements for proposed new systems. (See Section 3.4.2, Table 13 and Appendix C, Table C-4).

6. Increase in Depot Avionics Maintenance Costs is due to a substantial increase in new avionics systems. A large proportion of repair actions for the new systems will occur at the depot level, with a lesser proportion occurring at field and organizational levels. (See Section 2.1 and Appendix C, Table C-5).

Table 1 compares O&S costs for the baseline aircraft (F-16A) and the estimates developed for the F-16X MSIP aircraft. The substantial F-16 force size and a six year operating history provides the necessary historical data base for credible cost estimation. Reasons for significant variances between the O&S costs of the two aircraft are also outlined in Table 1. The estimated impact of each modification is explicitly identified in Table 1-A.

Table 2 presents the detailed historical O&S cost data for an F-16A squadron as derived from VAMOSC .

Table 3 presents a detailed O&S cost estimate for a hypothetical F-16X MSIP squadron.

GUIDANCE: THE TABLES LISTING THE O&S ANNUAL COSTS FOR A TYPICAL UNIT SHOULD UTILIZE A STANDARD USAF COST ELEMENT STRUCTURE, SUCH AS THE USAF DETAIL FORMAT EMPLOYED BY VAMOSC WSSC. THE COSTS SHOULD BE COMPARED TO THOSE OF THE AIRCRAFT PRIOR TO MODIFICATION, AND THE COST DIFFERENTIAL EXPLICITLY IDENTIFIED BY INDIVIDUAL MODIFICATION IMPACT. THE O&S COSTS SHOULD BE PRESENTED BY FISCAL YEAR AND SHOULD BE IDENTICAL TO THE FIGURES PRESENTED IN THE INTEGRATED PROGRAM SUMMARY (IPS).

These costs are based on a squadron of mature aircraft. To account for non-operating time due to aircraft delivery schedules, all aircraft delivered within a given year are assumed to accrue costs for only half of the year of delivery.

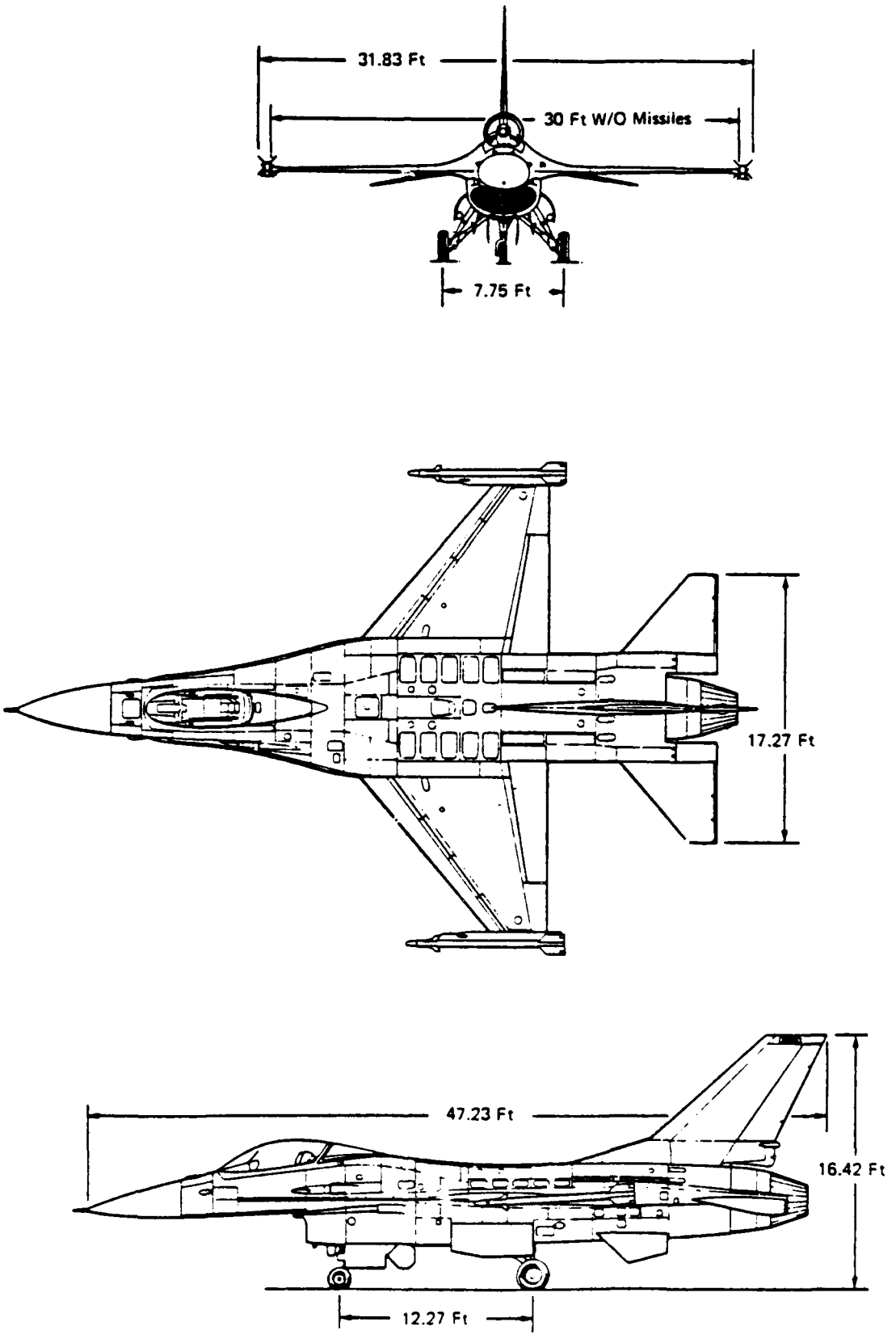


FIGURE 1. F-16 AIRCRAFT

GUIDANCE: VAMOSC DATA FACILITATES UTILIZATION OF THIS METHODOLOGY BY PROVIDING BASELINE MDS FORCE O&S COSTS, AND BY PROVIDING DETAILED O&S COST DATA FOR INDIVIDUAL SUBSYSTEMS AND COMPONENTS TO THE FIVE-DIGIT WUC (WORK UNIT CODE) LEVEL.

3.2 Data Sources

The sources used in defining the baseline costs and the method used in estimating the F-16X MSIP aircraft cost are listed in Table 10 for each of the cost elements.

GUIDANCE: INCLUDE A MATRIX OF SOURCES AND METHODS IN THE REPORT.

TABLE 10. DATA SOURCES AND METHODOLOGY

	F-16A BASELINE		F-16X MSIP	
Cost Element	Source	Method	Source	Method/Comment
UNIT OPERATIONS				
Aircrew	VAMOSC WSSC FY83, 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Command Staff	VAMOSC WSSC, FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Other Unit Personnel	VAMOSC WSSC, FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Security	VAMOSC WSSC, FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
POL	VAMOSC WSSC, FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Contractor Engineering estimate	Scaled by weight, profile drag, and power requirements (See Section 3.5)
Munitions Training	VAMOSC WSSC, FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Although the introduction of AMRAAM will increase the unit cost of training munitions, the firing rate is assumed to decrease; hence, no change in cost is contemplated
BELOW DEPOT MAINTENANCE				
Chief of Maint	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Avionics Maint	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline and VAMOSC CSCS FY-83-4	Built-up from like/similar analysis & scaled by materiel reliability, and manpower (See Appendix C & Table C-1)
Field Maint	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change

TABLE 10. DATA SOURCES AND METHODOLOGY (continued)

	F-16A BASELINE		F-16X MSIP	
Cost Element	Source	Method	Source	Method/Comment
Munitions/Missile maintenance	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Organizational Maint	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Aircraft Generation Sq	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline and VAMOSC CSCS FY-83-3	Built-up from like/similar analysis & scaled by materiel & reliability (See Appendix C & Table C-2).
Component Repair Sq	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline and VAMOSC CSCS FY-83-3	Built-up from like/similar analysis & scaled by materiel & reliability (See Appendix C & Table C-3).
Equipment Maint Sq	VAMOSC WSSC FY83 11 APR 84 (RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
INSTALLATION SUPPORT				
Real property Maint	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Squadron manning
Communications	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Squadron manning
Base Operations	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Squadron manning
SUSTAINING INVESTMENT				
Replacement Spares	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline and VAMOSC CSCS FY-83-3	Built-up from like/similar analysis & scaled by reliability and materiel (See Appendix C & Table C-3).
Mod Kits/Materiel	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	No change; F-16X MSIP is costed as mature aircraft. Additional modifications are assumed to continue at current rate.
Replacement Supp Equip	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
Equipment Maintenance Squadron	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Not significantly affected by Modification Program; no change
DEPOT MAINTENANCE				
Modifications	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	No change anticipated due to lack of Depot Level configuration modifications (See Table 6)
Engine Maintenance	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	No change anticipated due to lack of significant engine configuration modification (See Table 6)
Avionics Maintenance	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline and VAMOSC CSCS FY-83-3	Built-up from like/similar analysis & scaled by materiel & reliability (See Appendix C & Table C-4)
Other Maintenance	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline and VAMOSC CSCS FY-83-4	Built-up from like/similar analysis & scaled by material & reliability (See Appendix C & Table C-5)
GENERAL DEPOT SUPPORT	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Depot Maint. costs
DEPOT INSTALLATION SUPPORT				
Real Property Maintenance	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Depot Maint. Costs
Communications	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Depot Maint. Costs
Base Operations	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/Yr.	Baseline	Scaled by Depot Maint. Costs
MEDICAL CARE	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/yr.	Baseline	Scaled by Squadron Manning
PCS	VAMOSC WSSC FY83 11 APR 84(RPT# AR8103)	Normalized to a Sq/yr.	Baseline	Scaled by Squadron Manning

3.3 Like and Similar (L/S) Hardware List

The F-16X MSIP maintenance material and labor costs are estimated using a bottoms-up cost factor estimation technique. A set of functional analogies for the MSIP configuration changes was developed, thereby relating the new equipment to existing aircraft subsystems with VAMOSC historical reliability and cost data. These analogies extend to the five-digit WUC, where an individual modification's effect could be isolated to that level . . .

These functional analogies are considered valid for the costing only and are not intended to replicate the performance characteristics of F-16X MSIP equipment . . .

A listing of L/S equipment is contained in Table 11.

GUIDANCE: WHEN SELECTING L/S HARDWARE, EVALUATE PHYSICAL CHARACTERISTICS (WT., SIZE), TECHNOLOGY CONTENT, OPERATIONAL ENVIRONMENT, SYSTEM COMPLEXITY, AND FUNCTIONAL CHARACTERISTICS TO OPTIMALLY MATCH COMPONENTS. CONSULT SPO OR CONTRACTOR ENGINEERING PERSONNEL FOR ASSISTANCE IN EVALUATING POTENTIAL L/S COMPONENTS. UTILIZE VAMOSC CSCS TO COLLECT HISTORICAL RELIABILITY, MAINTAINABILITY AND O&S COST DATA FOR EACH SPECIFIED L/S COMPONENT. ALSO, COMPILE DATA FOR ANY SYSTEM TO BE REPLACED, AND DEVELOP THE CHANGE RESULTING FROM THIS REPLACEMENT. THE CUMULATIVE CHANGE IN O&S COSTS CAN THEN BE APPLIED TO THE BASELINE WEAPON SYSTEM SUPPORT COSTS (WSSC) MDS COST DATA, THEREBY PORTRAYING THE NEW SYSTEM'S COSTS.

TABLE 11

L/S HARDWARE LIST

MOD #	MODIFICATION DESCRIPTION	F-16X MSIP WUC	LIKE AND SIMILAR MDS	WUC	NOMENCLATURE	SELECTION RATIONALE
0822	Direct Power Source for Flight Control System (FCS)	42D00	F-15A	42P0A	Motor-Generator, Emergency Power	The L/S Motor-Generator has similar physical, functional & operational characteristics. However, the Samarium-Cobalt magnets are more technologically . . .
CCP-9149	Joint Tactical Information Distribution System (JTIDS)	63B00	F-15A	76GP0 74PQ0 76DP0	Trans/Rcvr. Processor Power Supply	. . .
PENDING	EJS (Anti-Jam UHF Communications)	63X00	F-16A	63B00	Secure Voice Set	. . .
CCP-9101F	Upfront Communications, Navigation & Identification (IFF Component)	65X00	F-16A	65X00	IFF System	. . .
CCP-9145	Global Positioning System	71D00	F-15A	61AD0 74P00 76DP0	Rcvr. Subassy Signal Proc. Power Supply	. . .
CCP-9101F	Upfront Communications & Identification (NAV - Component)	71X00	F-16A	71A00	TACAN NAV Set	. . .
CCP-9101F	AN/APG-68 Fire Control Radar	74A00	F-15A	74P00	AN/APG-63 Fire Control Radar	. . .
CCP-9101F	Expanded Capacity Fire Control Comp.	74C00	F-16A	74CC0	Fire Control Computer	. . .
CCP-9101F	Data Transfer Unit	74H00	F-15A	76GP0 76QD0	Data Processor Power Supply	. . .
CCP-9101F	Low Altitude Targeting Infrared for Night (LANTIRN) Pod	74N00	F-4E	74N00	AN/AVQ-26 "Pave Tack" Pod	. . .
CCP-5763	Precision Location Strike System (PLSS)	73G00	F-4G	73G00 76AA0 76AG0 76B00	Converter, Signal Data Radome Power Supply Processor, Homing Antenna	. . .
CCP-9101F	Advanced Central Interface Unit (ACIU)	75X00	F-16	75DC0	Interface Unit	. . .
CCP-9140	AMRAAM Provisions and LAU-129 Launcher	75C00	F-16A	75CA0 75CJ0	Launcher, Wing Interface Unit	. . .
PENDING	GPU-5A 30MM Gun Pod	75X00	A-10A	75B00	GAU-8 30MM Gun Pod	. . .
CCP-9142	Airborne Self Protection Jammer	76C00	F-4E	76G00	AN/ALQ-131 ECM Pod	Although the operational and physical characteristics are different since the AN/ALQ-131 is Pod-Mounted and the ASPJ is contained internally, the functions are similar. Technologically, both are scheduled to incorporate VHSIC . . .
CCP-9111	ALR-74 Warning Receiver	76E00	F-16A	76E00	ALR-69 Warning Receiver	. . .

3.4 Derivation of Scalars

In order to use baseline data to project the O&S costs of the F-16X MSIP, it was necessary to identify differences between the systems and quantify these differences through the development of scalars. The derivation of the aforementioned scalars is explained in the following paragraphs . . .

GUIDANCE: ESTABLISH PROPORTIONAL RELATIONSHIPS BETWEEN THE L/S SYSTEMS AND THE NEW SYSTEMS, BASED ON THE ESTIMATED EFFECT OF DIFFERING PHYSICAL, RELIABILITY AND MAINTAINABILITY (R&M), TECHNOLOGICAL AND OPERATIONAL CHARACTERISTICS. THE ASSISTANCE OF SPO CONTRACTOR ENGINEERING DATA AND/OR PERSONNEL IS USUALLY REQUIRED TO ACCURATELY DEVELOP THE MODIFICATION SCALARS.

THE SCALARS SHOULD THEN BE APPLIED TO THE BASELINE NORMALIZED CSCS COST DATA TO DETERMINE THE ESTIMATED O&S COST OF THE NEW SYSTEMS.

3.4.1 Reliability and Maintainability

For purposes of this costing analysis, reliability data is provided to the three to five digit WUC level for selected O&S cost-significant modifications in Table 12.

In cases where a modification involves replacement of an existing subsystem, the data of the predecessor subsystem is subtracted to produce net reliability data for the modification . . . This historical data is then compared to reliability estimates for the new subsystems, and scalars are derived . . .

TABLE 12. MODIFICATION-SPECIFIC RELIABILITY SCALAR DERIVATION

WUC	MOD #	MOD DESCRIPTION	A LIKE/SIMILAR MFHBF	B F-16X MSIP MFHBF	C RELIABILITY SCALAR
1. 42DE0	0822	Provide Direct Power for Flight Control System	1984	2742	.72
2. 63B00	CCP-9149	Joint Tactical Information Distribution System (JTIDS)	112	137	.82
3. 63X00	PENDING	EJS (Anti-Jam UHF Communications)	3148	4722	.67
4. 65X00	CCP-9101F	Upfront Communications, Navigation & Identification (IFF Component)	2132	3405	.63
5. 71D00	CCP-9145	Global Positioning System	132	163	.81
6. 71X00	CCP-9101F	Upfront Communications Navigation & Identification (NAV Component)	2107	3040	.69
7. 74A00	CCP-9101F	AN/APG-68 Fire Control Radar	262	345	.76
8. 74C00	CCP-9101F	Expanded Capacity Fire Control Computer	183	254	.72
9. 74H00	CCP-9101F	Data Transfer Unit	402	581	.70
10. 74N00	CCP-9101F	Low Altitude Navigation Infrared for Night (LANTIRN) Pod	224	268	.84
11. 74W00	CCP-9763	Precision Location Strike System (PLSS)	485	675	.72
12. 75X00	CCP-9101F	Advanced Central Interface Unit (ACIU)	397	463	.86
13. 75C00	CCP-9140	Advanced Medium Range Air-to-Air Missile (AMRAAM) Provisions	830	896	.93
14. 75X00	PENDING	GPU-5A 30MM Gun Pod	2540	2650	.96
15. 76C00	CCP-9142	Airborne Self-Protection Jammer (ASPJ)	659	745	.88
16. 76E00	CCP-9111	ALR-74 Warning Receiver	420	570	.74

GUIDANCE: WHEN AVAILABLE, USE TEST DATA AVAILABLE FROM THE SPO OR CONTRACTOR IN ESTABLISHING R&M FACTORS. IF TEST DATA IS USED IN CONJUNCTION WITH L/S HISTORICAL DATA, APPLY A DERATING FACTOR TO TEST DATA TO ACCOUNT FOR IDEAL LAB CONDITIONS.

UTILIZE VAMOSC CSCS TO COLLECT HISTORICAL RELIABILITY DATA FOR L/S COMPONENTS. CSCS PROVIDES A VARIETY OF RELIABILITY AND MAINTAINABILITY DATA, INCLUDING MEAN TIME BETWEEN MAINTENANCE (MTBM), NUMBER AND TYPE OF MAINTENANCE EVENTS, NUMBER AND TYPE OF MAINTENANCE MANHOURS (ON AND OFF EQUIPMENT), MEAN TIME TO REPAIR (MTTR), REPAIRABLE THIS STATION (RTS), NOT REPAIRABLE THIS STATION (NRTS), CONDEMNATIONS, ETC. THIS DATA IS AVAILABLE TO THE FIVE DIGIT WUC LEVEL IN CSCS REPORTS AR-8105, AR-8107, AND AR-8114.

3.4.1.1 Modification #0822 - Provide Direct Power to FCS

Mean Flight Hours Between Failures (MFHBF) is anticipated to increase from 1984 to 2742 due to the greater reliability of the samarium-cobalt solid magnet generator motor being incorporated . . .

The L/S component selected, an F-15A generator motor, is similar in physical and operational characteristics; however, the new technology incorporated and the resultant engineering estimate led to the derivation of a scalar of 1.38 . . .

3.4.1.2 Modification #CCP-9149 - Joint Tactical Information Distribution System...

3.4.1.3 . . .

3.4.1.16 Modification # CCP-9111 - ALR-74 Warning Receiver

An increase in reliability is anticipated due to the planned incorporation of Very High Speed Integrated Circuits (VHSIC). However, complexity of the ALR-74 is anticipated to increase over the ALR-69, thereby negating some of the increased reliability influence . . .

3.4.2 Materiel

A materiel cost scalar is derived for each scheduled F-16X MSIP O&S cost-significant modification. These modification-specific scalars are the basis of the materiel cost estimates . . .

Materiel cost data and derivation of the scalars is presented in Table 13 . . .

GUIDANCE: UTILIZE VAMOSC CSCS TO COLLECT MODIFICATION-SPECIFIC MATERIAL COST DATA. CSCS PRODUCES DETAILED MATERIEL COST DATA TO THE FIVE DIGIT WUC LEVEL. BELOW-DEPOT MAINTENANCE DATA IS DISPLAYED IN: 1. TOTAL BASE WUC COST REPORT (AR8107); 2. BASE WUC COST REPORT (AR8105); 3. ASSEMBLY-SUBASSEMBLY WUC COST REPORT (AR8115); 4. TOTAL BASE AND DEPOT WUC COST REPORT (AR8108)

DEPOT MAINTENANCE MATERIEL COST DATA IS AVAILABLE FROM THE FOLLOWING: 1. DEPOT ON-EQUIPMENT WUC COST REPORT (AR8111) and; 2. TOTAL BASE AND DEPOT WUC COST REPORT (AR8108).

UNIT PRICE DATA IS DISPLAYED TO THE FIVE-DIGIT WUC LEVEL THROUGH THE FOLLOWING REPORTS: 1. MDS-NSN-WUC CROSS REFERENCE REPORT (AR8109); 2. MDS-WUC-NSN CROSS REFERENCE REPORT (AR8110).

TABLE 13. MODIFICATION-SPECIFIC MATERIEL COST SCALAR DERIVATION

	WUC	MOD #	MOD DESCRIPTION	A LIKE/ SIMILAR UNIT PRICE	B F-16X MSIP UNIT PRICE	C MOD-SPECIFIC MATERIEL COST SCALAR
1.	4ZDE0	0822	Provide Direct Power for Flight Control System	$11,852	$20,300	1.71
2.	63B00	CCP-9149	Joint Tactical Information Distribution System (JTIDS)	$285,539	$640,000	2.24
3.	63X00	PENDING	EJS (Anti-Jam UHF) Communications	$55,100	$135,000	2.45
4.	65X00	CCP-9101F	Upfront Communications, Navigation and Identification	$56,425	$84,500	1.50
5.	71D00	CCP-9145	Global Positioning System	$201,819	$311,000	1.54
6.	71X00	CCP-9101F	Upfront Communications Navigation and Identification (NAV Component)	$13,0[illegible]	$31,600	2.[illegible]
7.	74A00	CCP-9101F	AN/APG-68 Fire Control Radar	$1,2[illegible],000	$1,650,000	1.38
8.	74C00	CCP-9101F	Expanded Capacity Fire Control Computer	$11[illegible],930	$216,000	1.90
9.	74400	CCP-9101F	Data Transfer Unit	$[illegible],954	$212,400	1.06
10.	74N00	CCP-9101F	Low-Altitude Targeting Infra-Red for Night (LANTIRN) Pod	$1,051,000	$2,340,000	2.23
11.	74W00	CCP-5[illegible]	Precision Location Strike System (PLSS)	$140,194	$320,000	2.28
12.	74X00	CCP-9[illegible]	Advanced Central Interface Unit (ACIU)	$375,443	$410,000	1.09
13.	75C00	CCP-9140	Advanced Medium Range, Air-to-Air Missile (AMRAAM) Provisions	$464,563	$485,000	1.04
14.	75X00	PENDING	GPU-5A 30MM Gun Pod	$240,000	$220,000	.92
15.	75C00	CCP-9142	Airborne Self-Protection Jammer (ASPJ)	$180,000	$350,000	1.94
16.	76E00	CCP-9111	ALR-74 Warning Receiver	$151,832	$170,000	1.12

Unit price data was utilized as the basis for materiel scalar derivation, since the F-16X MSIP modifications will affect component-related replacement and repairs . . .

3.4.2.1 Modification #0822-Provide Direct Power for FCS

The unit price of the samarium-cobalt generator motor is substantially higher than the conventional wire-wrapped magnet motor selected as the L/S component. Contract data indicates the unit price will be $20,300 for the new motor, producing a scalar of 1.71 . . .

3.4.2.2 Modification #CCP9149-Joint Tactical Information Distribution System

3.4.2.3 . . .

GUIDANCE: SELECT MATERIEL DATA THAT IS MOST APPROPRIATE FOR THE ANALYSIS AT HAND. AIRCRAFT SYSTEM MODIFICATION SCALARS NORMALLY CAN BE DEVELOPED BY USING UNIT PRICE DATA. A CHANGE IN MAINTENANCE CONCEPT OR OPERATIONAL PROFILE MIGHT MAKE DIRECT MATERIEL COST DATA MORE APPROPRIATE FOR SCALAR DEVELOPMENT.

MATERIEL COST FOR THE NEW SYSTEM SHOULD BE OBTAINED FROM CONTRACT DATA OR SPO/CONTRACTOR ESTIMATES. THE DIFFERENCE BETWEEN THE LIKE/SIMILAR VAMOSC CSCS HISTORICAL DATA AND THE NEW SYSTEM ESTIMATES WILL ACCOUNT FOR DIFFERING PHYSICAL, TECHNOLOGICAL AND OPERATIONAL CHARACTERISTICS. EACH MODIFICATION SCALAR SHOULD BE BRIEFLY JUSTIFIED.

3.5 Petroleum, Oils and Lubricants (POL) Consumption

Additional weight, drag and parasitic power requirements imposed by the scheduled F-16X MSIP configuration changes will increase F-16X MSIP fuel consumption relative to that of the F-16A baseline aircraft. The average F-16A POL consumption rate is 753 gallons per hour as obtained from AFR173-13, dated 1 February 1984. The contractor, after conducting a full aerodynamics analysis, forecasts F-16X MSIP fuel consumption to be 16% higher than the F-16A, or XXX gallons per hour...

3.5.1 Modification #0822 - Provide Direct Power Source for FCS

Contractor engineering estimates indicate the net weight impact of Mod. # 0822 is 52 lbs. Since the configuration is internal, no increase in drag is anticipated. However, the generator-motor to be added will require .5KW of ram air cooling. In addition, the parasitic power drain imposed by the generator-motor will increase specific fuel consumption (SFC) at cruise by . . . This modification will account for one percent of the change in POL consumption, or $8,720 per year per squadron, according to SPO estimates . . .

3.5.2 Modification # CCP-9149 - Joint Tactical Information Distribution System . . .

GUIDANCE: WHEN AN ENGINEERING ESTIMATE MUST BE UTILIZED TO COMPUTE THE O&S COST IMPACT OF ANTICIPATED CONFIGURATION CHANGES, PROVIDE AN EXPLANATION OF THE ESTIMATE AS CONVEYED BY THE SPO/CONTRACTOR SOURCE.

THE POL COST IMPACT OF EACH MODIFICATION CAN BE ESTIMATED IN CONSULTATION WITH SPO/CONTRACTING ENGINEERING PERSONNEL. BY ISOLATING THE NET WEIGHT, PROFILE DRAG, & POWER CONSUMPTION IMPACT OF EACH MOD, A PERCENTAGE ESTIMATE OF THE TOTAL INCREASE IN POL CONSUMPTION CAN BE ALLOCATED.

4. SENSITIVITY/RISK ANALYSIS

In order to increase confidence in the O&S cost estimate for the F-16X MSIP aircraft, the sensitivity of O&S cost to factors such as reliability has been evaluated by obtaining three reliability estimates to illustrate the potential range of values . . .

GUIDANCE: INCLUDE AN INDICATION OF THE CONFIDENCE IN THE FIGURES PRESENTED.

4.1 General

Reliability and POL consumption appear to present the greatest risk potential for cost variability . . .

GUIDANCE: DEVELOP A FURTHER, DETAILED ANALYSIS OF THE COST IMPACT OF EACH COST ELEMENT OFFERING A POTENTIAL FOR HIGH COSTS, ESPECIALLY THOSE OF WHICH THE VALUE ESTIMATED FOR THE O&S COST ANALYSIS COULD VARY WIDELY. IDENTIFY THE RANGE OF VALUES SELECTED FOR SENSITIVITY ANALYSIS AND THE RATIONALE FOR SELECTION. PRESENT THE RESULTS USING IDENTICAL GRAPHICAL VALUES WHENEVER POSSIBLE TO FACILITATE A COMPARISON.

4.2 Reliability Sensitivity

The range of reliability values was based on a review of the design maturity of the modification and the confidence in the scalars applied to each modification. Table 14 identifies the range of reliability values for each modification.

TABLE 14. MODIFICATION RELIABILITY SENSITIVITY

WUC	MOD #	MOD DESCRIPTION	MEAN FLYING HOURS BETWEEN FAILURES (MFHBF) LOW HOURS	EXPECTED HOURS	HIGH HOURS
4ZDBO	0822	Provide Direct Power for Flight Control System	2600	2742	2850
63B00	CCP-9149	Joint Tactical Information Distribution System (JTIDS)	115	137	145
63X00	PENDING	EJS (Anti-Jam UHF Communications)	3100	4722	6050
65X00	CCP-9101F	Upfront Communication & Identification (IFF Component)	2500	3405	4200
71D00	CCP-9145	Global Positioning System	145	163	170
71X00	CCP-9101F	Upfront Communication & Identification (NAV Component)	2600	3040	3450
74A00	CCP-9101F	AN/APG-68 Fire Control Radar	315	345	375
74C00	CCP-9101F	Expanded Capacity Fire Control Computer	225	254	280
74B00	CCP-9101F	Data Transfer Unit	475	581	645
74N00	CCP-9101F	Low Altitude Targeting Infra-Red for Night (LANTIRN) Pod	185	224	260
74W00	CCP-5763	Precision Location Strike System (PLSS)	490	675	810
75X00	CCP-9101F	Advanced Central Interface Unit (ACIU)	415	463	505
75C00	CCP-9140	Advanced Medium Range Air-to-Air Missile (AMRAAM) Provisions	725	830	890
75X00	PENDING	GPU-5A 30MM Gun Pod	2350	2650	2825
76C00	CCP-9142	Airborne Self-Protection Jammer (ASPJ)	610	745	915
76E00	CCP-9111	ALR-74 Warning Receiver	510	570	635
*AGGREGATE MODIFICATION IMPACT (MFHBF)			23.75	28.06	30.47
F-16A BASELINE SYSTEM (MFHBF)			3.82	3.82	3.82
F-16X MSIP SYSTEM (MFHBF)			3.29	3.36	3.39

	COST DELTA** LOW HOURS	EXPECTED HOURS	HIGH HOURS
BELOW DEPOT MAINTENANCE	+$269,882/Sq.	-	-$117,347/Sq.
DEPOT MAINTENANCE	+$ 84,062/Sq.	-	-$ 36,549/Sq.
REPLACEMENT SPARES	+$ 27,002/Sq.	-	-$ 10,340/Sq.
TOTAL	+$380,946/Sq.	-	-$164,236/Sq.

* Aggregate Modification Impact = Sum of Reciprocals of Mod MFHBFs
** Cost Delta = Change in # of Failures X Cost per Failure

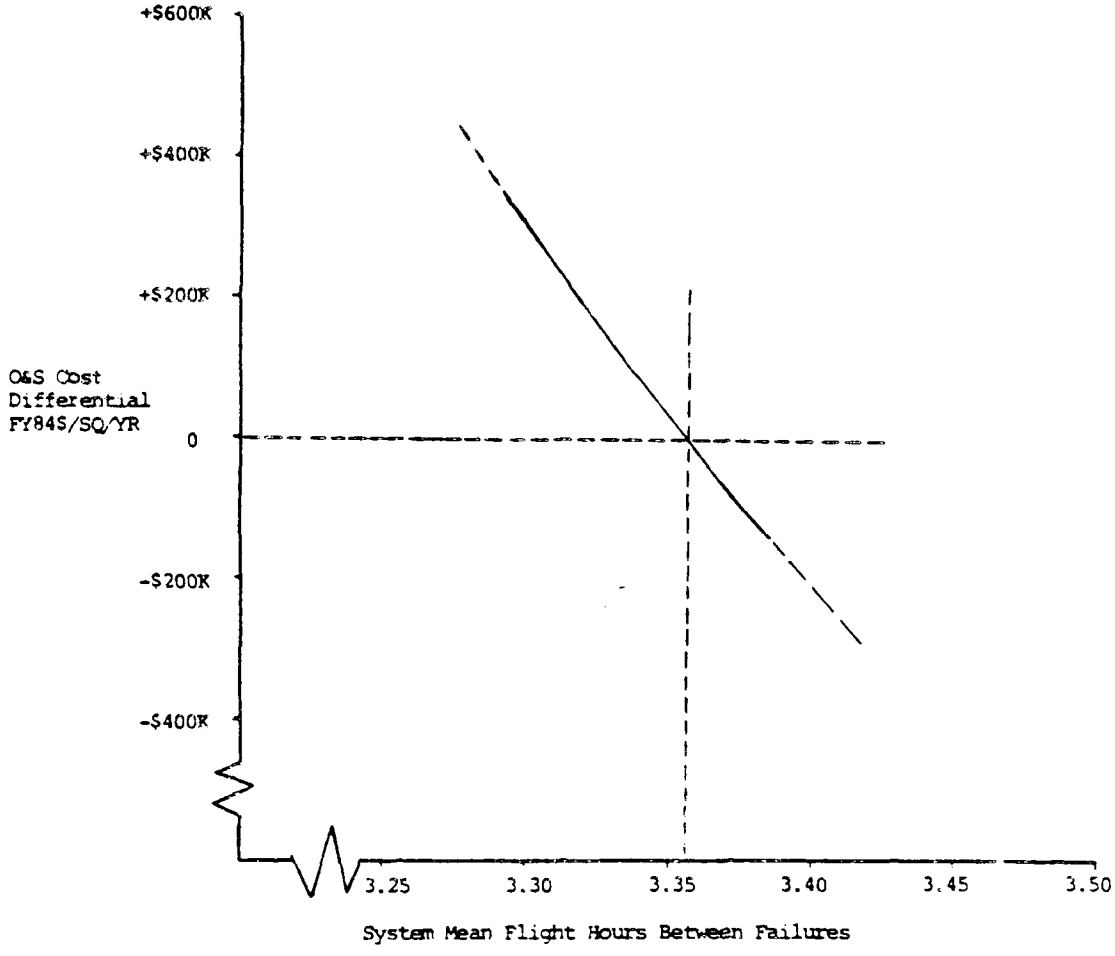


FIGURE 3. RELIABILITY SENSITIVITY GRAPH

TABLE C.1

BELOW DEPOT AVIONICS MAINT. MATERIEL COST COMPUTATION

WUC	MDS #	DESCRIPTION	VAMOSC CSCS LIKE/SIMILAR BELOW DEPOT MATERIEL COST	X	RELIABILITY** SCALAR	X	MATERIAL*** SCALAR	X	% MATERIEL * CONSUMED AT AVIONICS MAINTENANCE	=	CHANGE IN AVIONICS MAINTENANCE MATERIEL COST
63X00	CCP-9149	JTIDS	$13,063		.82		2.24		5%		1,200
63X00	PENDING	EJS	$ 7,464		.67		2.45		5%		613
65X00	CCP-9101F	UFCNI IFF	$24,881		.63		1.50		5%		1,176
71X00	CCP-9145	GPS	$11,922		.81		1.54		5%		744
71X00	CCP-9101F	UFCNI NAV	$ 5,961		.69		2.43		5%		500
74A00	CCP-9101F	AN/APG-68	$87,083		.76		1.38		5%		4,567
74C00	CCP-9101F	EXCAP FCC	$43,542		.72		1.90		5%		2,978
74H00	CCP-9101F	DTC	$ 8,708		.70		1.06		5%		323
74N00	CCP-9101F	LANTIRN	$58,055		.84		2.23		5%		5,437
74K0	CCP-5763	PLSS	$31,930		.72		2.28		5%		2,621
74X00	CCP-9101F	ACIU	$14,514		.86		1.09		5%		680
75C00	CCP-9140	AMRAAM	$18,246		.93		1.04		5%		882
76D00	CCP-9142	ASPJ	$19,490		.88		1.94		5%		1,664
76R00	CCP-9111	ALR-74	$ 8,771		.74		1.13		5%		363

AGGREGATE MODIFICATION IMPACT $23,748

F-16A MSSC BASELINE COST (Table 2, Line 11, Column B) $30,000

F-16X MSIP AVIONICS MAINTENANCE MATERIEL COST PER SQUADRON PER YEAR (Table 3, Line 11, Column B) $53,748

or $.054M

** From Table 12

*** From Table 13

*GUIDANCE: THE PERCENTAGES OF AVIONICS MATERIEL CONSUMED AT THE AVIONICS MAINTENANCE FUNCTION IS DETERMINED BY THE MAINTENANCE CONCEPT. SPECIFIC BELOW DEPOT MATERIEL CONSUMPTION BY FUNCTION (AVIONICS MAINTENANCE, COMPONENT REPAIR SQ., AIRCRAFT GENERATION SQ.) IS NOT AVAILABLE IN CSCS. CONSEQUENTLY, THE MATERIEL COST PER WUC AND MODIFICATION MUST BE EITHER ALLOCATED ACCORDING TO THE PROPORTIONS OF THE BASELINE AIRCRAFT OR, MORE PRECISELY, ACCORDING TO THE PROPORTIONS ANTICIPATED BY THE MAINTENANCE CONCEPT FOR EACH MODIFICATION.

APPENDIX C. F-16X MSIP MATHEMATICAL COMPUTATIONS

GUIDANCE: PROVIDE THE MATHEMATICAL COMPUTATIONS USED TO CALCULATE THE COST ELEMENTS. DO NOT DUPLICATE COMPUTATIONS PERFORMED IN VAMOSC WSSC OR FOR ELEMENTS UNAFFECTED BY THE MODIFICATION PROGRAM. ALL BASELINE MDS HISTORICAL OPERATING AND SUPPORT COSTS ARE AUTOMATICALLY CALCULATED BY VAMOSC WSSC, AND ARE DISPLAYED IN THE MDS OPERATING AND SUPPORT COST REPORT (AR-8103). THIS REPORT CAN BE NORMALIZED FOR A SQUADRON OR AIRCRAFT LEVEL FOR PURPOSE OF COMPARISON.

EACH CALCULATION SHOULD BE CLEARLY TRACEABLE TO THE SUMMARY TABLES IN SECTION 1. THEREFORE, NUMBER ALL ROWS AND COLUMNS IN THE SUMMARY TABLES, AND PROVIDE A LOCATOR CODE IN PARENTHESIS AFTER EACH APPENDIX CALCULATION. ALL CALCULATIONS SHOULD BE DISPLAYED IN ORDER OF COST ELEMENTS, WITH EACH SUBELEMENT COMPUTATION PRESENTED WITHIN THE PRIMARY ELEMENT SECTION.

NOTE: All baseline F-16A VAMOSC WSSC cost figures utilized in the following calculations were obtained directly from Table 2.

UNIT OPERATIONS

POL (Table 3, Line 7)

POL Cost = Consumption Rate x FH/PAA x PAA/Squadron x Cost per Gallon
= 873 gallons/hr x 305 hrs. x 24 acft. x $1.00
= $6.390M/Squadron/Year

BELOW DEPOT MAINTENANCE

Avionics Maintenance (Table 3, Line 11)

Materiel Cost = F-16A WSSC Materiel Cost + Summation of MSIP Materiel Cost Impacts (See Table C.1)
= $.054M/Squadron/Year

Table B.1. Configuration Change List(Con't)

WUC	MOD. #			A	B	C	D	E	F	G	H	I
75 (continued)			WEAPONS DELIVERY									
	75C00	CCP-9140	Incorporate AMRAAM Capability in F-16A/B	V	+	Yes	+425	+3.45	+4100	+5800	+200	Yes
	75D80	0361	Add Threshold Detect/Bypass Selection for Boresight Spot Made of AIM-9L	III	0	No	NC	0	0	0	0	No
	74H00	0603R1	Modify Stores Control Panel to Eliminate Flickering of Display Lamps	III	0	No	NC	0	0	0	0	No
76			PENETRATION AIDS AND ECM									
76C00	CCP-9142		Testing of the Airborne Self-protection Jammer (ASPJ)	V	+	Yes	+405	+7.2	+100	0	+1.37 KW ECS +6.12 KW RAMAIR	Yes
76E00	0947		Install Improved ALR-69 Amplifier Detector and Frequency Selective Receiver in F-16	V	+	No	NC	0	0	0	0	No
76E00	CCP-9111		Install ALR-74 Warning Receiver in F-16 Aircraft	V	+	Yes	+89	.4KVA	+100	0	750	Yes

Table B.1. Configuration Change List(Con't)

WUC	MOD. #		A	B	C	D	E	F	G	H	I
74 (continued)		FIRE CONTROL SYSTEM									
74CC0	0913	Incorporate Block 15S Fire Control Computer and Stores Management Operational Flight Programs	III	0	No	NC	0	0	0	0	No
74CD0	CCP-9120	Multiple Store Ejection Rack (MSER) Integration	V	+	No	TBD	TBD	TBD	TBD	TBD	No
74D00	CCP-9122	Incorporation of Standard USAF Inertial Navigation Unit (INU)	III	-	No	NC	TBD	TBD	TBD	TBD	Yes
74EA0	0836	Cockpit TV Sensor Split Screen Capability F-16A/B	V	+	No	TBD	TBD	TBD	TBD	TBD	No
74EAC	0456C1	Revise Radar/E-O Indicator Unit to Accommodate Revised Video Amplifier	III	0	No	NC	0	0	0	0	No
74EB0	0365	Revise Radar/E-O Electronics Unit	III	-	No	NC	0	0	0	0	No
74EBA	0457	Revise Radar/E-O Electronics Unit to Correct Bandwidth Characteristics of Video Processor and Horizontal Jitter	III	0	No	NC	0	0	0	0	No
74G00	CCP9169	Incorporate WAC Head-up-Display (HUD) in F-16 Air Vehicles. LANTIRN HUD Alternative Wide Angle Optics	III	+	No	NC	0	0	0	0	No
74H00	CCP-9101F	Data Transfer Unit Installation	III	+	Yes	+53	TBD	TBD	TBD	TBD	Yes
74N00	CCP-9163 CCP-9151 CCP-9153	LANTIRN Installation	V	+	Yes	+1010	+10.8	+1000	+600	0	Yes
74NN0	CCP-9137	AGM-65D Development, Integration and Testing	V	+	No	TBD	TBD	TBD	TBD	0	No
74XN0	CCP-5763/ 9156	Precision Location Strike System (PLSS) Integration	V	+	Yes	+129	+500	+1000	+750	500	Yes
75		WEAPONS DELIVERY									
74000	0556	Modify Stores Management System CIU to Correct Block 10 Software Deficiencies	III	0	0	NC	0	0	0	0	No
75000	None	Incorporation of GPU-5A 30MM Gun Pod	V	+	Yes	+2800	TBD	0	0	0	No
75C00	0569R1	Incorporate Capability for Air Combat Maneuvering Instrumentation (ACMI) Pod	V	+	No	NC	0	0	0	0	No
74C00	035OR1R2	Block 15 Sequential Provisioning AMRAAM, MSER Provisions	III	+	No	TBD	TBD	TBD	TBD	TBD	No
75C00	0935	Early Production Incorporation of AMRAAM F-16	V	+	Yes	TBD	TBD	TBD	TBD	TBD	No

Table B.1. Configuration Change List(Con't)

WUC	MOD. #		A	B	C	D	E	F	G	H	I
63		UHF COMMUNICATIONS									
63000	None	EJS (ANTI-JAM UHF Communications) Incorporation	V	+	Yes	+25	TBD	TBD	TBD	TBD	Yes
63B00	1018	Install "Have Quick" Group 'B' Provision AN/ARC-164C in F-16	V	+	No	+25	TBD	TBD	TBD	TBD	Yes
63B00	CCP-9149	Joint Tactical Information Distribution System (JTIDS) Integration	V	+	Yes	+112	+1.5	+1400	+780	+1.5 KW	Yes
63B00	0327C2	Secure Voice with ARC-186	III	+	No	+2	0	0	0	0	No
63BE0	0896	Incorporate Modification to Reduce Multi-path Signal Scattering Effects from Upper UHF/IFF Antenna	III	+	No	+12.1	0	0	0	0	No
63C00	0795R1C1	"Have Quick" Group 'A' Provisions for F-16	V	+	No	NC	0	+780	0	0	Yes
65		IFF SYSTEM									
65000	CCP-9101F	Upfront Communication, Navigation, Identification (UFCNI) Incorporation IFF Function	III	+	Yes	+74	TBD	TBD	TBD	TBD	Yes
71		RADIO NAVIGATION									
71000	CCP-9245	Global Positioning System (GPS) Integration	V	+	Yes	+60.1		+500	0	100	Yes
7100U	CCP-9101F	Upfront Communication, Navigation, Identification (UFCNI) Incorporation Nav. Function	III	+	Yes	+40	TBD	TBD	TBD	TBD	Yes
74		FIRE CONTROL SYSTEM									
74000	None	WAAM (Wide Area Anti-Armor Munition) Integration	V	+	No	TBD	TBD	+1600	+1400	TBD	Yes
74A00	CCP-9101	Incorporate AN/APG-68 Fire Control Radar	III	+	Yes	+234	TBD	TBD	TBD	TBD	Yes
74A00	CCP-9101F	Advanced Central Interface Unit (ACIU) Integration	III	+	Yes	+345	TBD	TBD	TBD	TBD	Yes
74AA0	1005	Retrofit of AMRAAM Level III Capability in F-16 A/B	V	+	No	TBD	TBD	TBD	TBD	TBD	No
74AM0	0497	Provide Improved Radome Lightning Protection	III	-	No	NC	0	0	0	0	No
74BMB	0496	Block 15B Software Update	III	0	No	NC	0	-2500	-800	0	No
74C00	CCP-9101F	Expanded Capacity Fire Control Computer Installation	III	+	Yes	+28	TBD	TBD	TBD	TBD	No
74CC0	0406R1	Block 15B Software Update	III	0	No	NC	0	+1825	+1000	0	No
74CC0	064ZR1C1	Incorporate Fire Control Computer Operational Flight Program Changes/Software	III	+	No	NC	0	0	0	0	No

Table B.1. Configuration Change List(Con't)

WUC	MOD.#		A	B	C	D	E	F	G	H	I
42 (continued)		ELECTRICAL POWER SUPPLY									
42ABO	0756R1	Modify AC Generator to Incorporate Oil Line Reducer	III	-	No	0	0	0	0	0	No
42DBO	0822	Provide Direct Power Source to Flight Control System (FCS)	III	+	Yes	+52	TBD	TBD	0	TBD	No
42HBO	0678	Provide Main Battery Power to the FLCS Converter	III	0	No	0	0	0	0	0	No
42JAO	0815	Delete Synchronization of 800 Hz Inverters	III	-	No	0	0	0	0	0	No
42JBB	0782	Modify Flight Control System Battery Heater Circuits to Eliminate Inadvertent Inverter Battery Discharge	III	-	No	0	0	0	0	-	No
44		ELECTRICAL LIGHTING SYSTEM									
44A00	0287RICI	Improve Aerial Refueling Lighting for Night Operations	III	+	No	+1.8	.01	0	0	0	No
46		FUEL SYSTEM									
46000	0474	Installation of Automatic Forward Transfer Trim Circuits in Aircraft Fuel System	III	-	No	0	0	0	0	0	No
46000	0905	Install Orifice Plate to Left of External Tank Transfer Valve	III	0	No	TBD	0	0	0	0	No
46CAO	0709	Revise External Tank Vent and Pressurization Valve to Improve Reliability	III	-	No	0	0	0	0	0	No
46FAF	0212	Provide Capability of Selective Fill of External Fuel Tanks	III	0	No	+2	0	0	0	0	No
51		FLIGHT INSTRUMENTS									
51ABO	0993	Production Incorporation of Combined Altitude Radar Altimeter F-16 (CARA)	V	+	No	+12	TBD	0	0	0	Yes
51ABO	CCP-9124	Integration and Test of CARA	V	+	No	0	TBD	0	0	0	Yes
55		MALFUNCTION ANALYSIS AND RECORDING EQUIPMENT									
55AA0	0932	Provide Provisions for Crash Survivable Flight Data Recorder (CSFDR)	V	+	No	+	TBD	0	0	0	No
62		VHF COMMUNICATIONS									
62000	0602C1	Replace Standard Headset Wiring with Magnetically Shielded Wiring	III	0	No	0	0	0	0	0	No

Table B.1. Configuration Change List(Con't)

WUC	MOD.#		A	B	C	D	E	F	G	H	I
23 (continued)		TURBOFAN POWERPLANT									
23HAO	0490	Provide Electronic Engine Control Caution Light When Backup Fuel Control is Selected from Aft Cockpit	III	0	No	NC	0	0	0	0	No
23IAB	0539	Engine Emergency Warning System	III	-	No	+1.4	0	0	0	0	No
23IBA	0479	Revise Wiring from Throttle Position Relay to ESS	III	0	No	NC	0	0	0	0	No
23ICA	0433	Removal of Nacelle Vent Ejector Switch	III	0	No	NC	0	0	0	0	No
23IJA	0907	Modify Engine Warning Control Unit to Provide Time Delays in Warning and Caution Messages	III	U	No	NC	U	U	U	U	No
24		AUXILLARY POWERPLANT									
24AA8	0699C1	Redesign Emergency Power Unit Bleed Air Regulator Valve	III	-	No	0	0	0	0	0	No
24AEO	0613C1C2	Modification of Emergency Power Unit, Redesign EPU Fuel Control Valve Armature	III	-	No	0	0	0	0	0	No
24CBO	0465	Redesign Emergency Power Unit to Replace Speed Sensors	III	-	No	0	0	0	0	0	No
24CBO	0800	Delete the Connection of the Electrical Caution Light to the EPU Over-speed Detector	III	0	No	0	0	0	0	0	No
24CBO	0823	Revise EPU Controller to Eliminate Moisture Entrapment	III	-	No	0	0	0	0	0	No
24CBO	0630C1	Revise Emergency Power Unit (EPU) Controller Logic to Improve Redundancy of Secondary Speed Control	III	-	No	0	0	0	0	0	No
24DCO	0408	Provide Redesigned Engine Start System (ESS)Controller Harness, and Component Tester	III	-	No	0	U	0	0	0	No
41		ENVIRONMENTAL CONTROL SYSTEM									
41ABA	CCP-9101F	Incorporation of Expanded Capacity ECS	III	0	No	+49	0	0	0	0	No
42		ELECTRICAL POWER SUPPLY									
42000	0558	Modification of Aircraft Battery Failure Monitoring Circuit F-16A/B	III	-	No	0	0	0	0	0	No
42AA0	0722	Modify the Constant Speed Drive (CSD) Oil Servicing Fill Port	III	-	No	0	0	0	0	0	No
42AA0	0778	Constant Speed Drive (CSD) Hydraulic Accumulator	III	-	No	+10	0	0	0	0	No
42AA0	0977	Constant Speed Drive Accumulator Vibration Isolator Mounts	III	-	No	+1	0	0	0	0	No
42AA0	0819	Replace Constant Speed Drive (CSD) Oil Cooling Lines with Flexible Hose Assemblies F-16A/B	III	-	No	0	0	0	0	0	No

Table B.1. Configuration Change List

WUC	MOD. #		A	B	C	D	E	F	G	H	I
11		AIRFRAME									
11000	0544C1	Strengthen Web of Fuselage Station 341.8 Bulkhead to Prevent Cracking	III	-	No	No	+.4	0	0	0	No
11000	0762	Modification of Upper/ Lower Bulhead Splice	III	-	No	No	TBD	0	0	0	No
11000	0832	Install Stabilizing Supports to Fuselage Side Frames and Revise Harness Supports	III	-	No	No	TBD	0	0	0	No
11GDF	0288R1C1	Strengthen Skin around Arresting Hook	III	-	No	+2	0	0	0	0	No
12		CREW STATION SYSTEM									
12A00	0437	Interchange Master Fuel and BUC Switches in Aft Crew Station Only	III	0	No	NC	0	0	0	0	No
12C00	0426	Change Canopy Open/ Close Logic Circuitry	III	-	No	NC	0	0	0	0	No
13		LANDING GEAR SYSTEM									
13AA0	0596	Modification of Brake Circuitry to Incorporate Lower Audio Volume Level For Landing Gear Warning	III	0	No	NC	0	0	0	0	No
13BDC	0807	Eliminate Moisture Trapping in Main Gear Down-lock Switches	III	-	No	NC	0	0	0	0	No
13DBO	0686	Improve Moisture Proofing of the Nose Wheel Steering Feedback Potentiometer	III	-	No	NC	0	0	0	0	No
13E00	0546	Modification of Brake System Circuit F-16A/B	III	-	No	+.4	0	0	0	0	No
13EAG	0554	Incorporate Improved Brake Control Box F-16A/B	III	-	No	+1.0	0	0	0	0	No
13GAC	0667	Replace Arresting Hook Switch with New Switch Capable of Being Locked in both 'UP' and 'DOWN' Positions.	III	0	No	NC	0	0	0	0	No
14		FLIGHT CONTROL SYSTEM									
14000	0221R1C1	Incorporate Departure Warning System in F-16A/B	III	+	No	+1	0	0	0	0	No
14ADH	0802	Replace Diode Assemblies in Critical Electric Power/ Flight Control System Circuits	III	-	No	NC	0	0	0	0	No
14ALO	0623C1	Correction of Electronic Component Assembly (ECA) Memory to Correct Latch-up	III	+	No	NC	0	0	0	0	No
14CCA	0622	Improve Bearing Retention in Leading Edge Flap and Trailing Edge Flaper on Hinge Fittings	III	-	No	NC	0	0	0	0	No
14F00	0691	Improve Angle of Attack, Pilot Static and Air Data Probe Heater Circuits	III	-	No	NC	0	0	0	0	No
23		TURBOFAN POWERPLANT									
23000	0828	Install Clamp to Prevent Engine Harnes Chaffing	III	-	No	NC	0	0	0	0	No
23GAO	0401	Rework Engine Breather Ejector Tube	III	-	No	NC	0	0	0	0	No

APPENDIX B. CONFIGURATION CHANGE SUMMARY

HEADING INDEX

A - Modification class (III, V)
B - Estimated O&S cost impact (+, 0, -)
C - Major cost driver? (yes, no)
D - Estimated net weight impact (lbs)
E - Estimated net electrical power requirements (KVA)
F - Estimated net FCC memory impact (words)
G - Estimated net SMS memory impact (words)
H - Estimated electronic cooling impact (KW)
I - Is new technology incorporated? (yes, no)

GUIDANCE: WHEN CONDUCTING A PRELIMINARY EVALUATION OF PROSPECTIVE SYSTEM CONFIGURATION CHANGES, DESIGN A MATRIX WHICH LISTS THE MODIFICATIONS' IMPACTS ON O&S COST PARAMETERS.

IDENTIFY THE PROPORTION OF COST DRIVERS ACCORDING TO THE PRECISION REQUIRED BY THE USER, THEN COLLECT MODIFICATION COST & ENGINEERING DATA FROM THE SPO AND CONTRACTOR.

GUIDANCE: DIRECT MAINTENANCE MAN-HOUR DATA IS AVAILABLE IN CSCS TO THE FIVE DIGIT WUC. DIRECT MAINTENANCE MAN-HOUR DATA CAN BE COLLECTED FOR EACH MODIFICATION ANALOGY, THEREBY PRODUCING AN AGGREGATE DIRECT MAINTENANCE MAN-HOUR CHANGE, WHICH CAN BE UTILIZED BY MANPOWER ENGINEERING PERSONNEL TO ESTIMATE MANPOWER REQUIREMENTS. IN ADDITION, THE PROPORTION OF THE TOTAL CHANGE IN MAINTENANCE MAN-HOURS CAN BE USED TO ALLOCATE LABOR COST TO EACH MODIFICATION. THIS ASSISTS IN ISOLATING THE AGGREGATE O&S COST IMPACT OF EACH MODIFICATION, WHICH IS THE ULTIMATE GOAL OF A MODIFICATION PROGRAM COST ANALYSIS.

A.2 Chief of Maintenance

Because the forecast total increase in manning is relatively insignificant in aggregate terms (2%), no change in the Chief of Maintenance function is anticipated . . .

A.3 Avionics Maintenance

The introduction of a large number of new avionics systems will increase Avionics Maintenance manning by 3 personnel per squadron. According to the TAC LCOM Model, avionics modifications account for 81% of the total change in Direct Maintenance Man-Hours/Flight Hour (DMMH/FH) . . .

A.4 Field Maintenance...

GUIDANCE: INCLUDE A DETAILED NARRATION OF FACTORS THAT IMPINGE ON MAINTENANCE MANNING, SUCH AS CAPACITY OF FACILITIES, CONFIGURATION CHANGES, THROWAWAY VS. REPAIR IMPACT, AND MAINTENANCE CONCEPT.

TABLE A.1

DIRECT MAINTENANCE MAN-HOURS BY MODIFICATION (DMMH/FH)

	WUC	MOD. #	DESCRIPTION	A L/S DMMH/FH	B F-16XMSIP DMMH/FH	C % of TOTAL CHANGE
1.	42DEO	0822	POWER, FCS	.10	.12	5.6%
2.	63BOO	CCP-9149	JTIDS	.19	.15	7.0%
3.	63XOO	PENDING	EJS	.06	.07	3.3%
4.	65XOO	CCP-9101F	UFCNI IFF	.05	.06	2.8%
5.	71DOO	CCP-9145	GPS	.17	.19	8.9%
6.	71XOO	CCP-9101F	UFCNI NAV	.07	.08	3.7%
7.	74AOO	CCP-9101F	AN/APG-68	.14	.16	7.8%
8.	74COO	CCP-9101F	EXCAP FCC	.04	.05	2.3%
9.	74HOO	CCP-9101F	DTU	.06	.07	3.3%
10.	74NOO	CCP-9101F	LANTIRN	.41	.46	21.4%
11.	74WOO	CCP-5763	PLSS	.21	.23	10.7%
12.	74XOO	CCP-9101F	ACIU	.11	.13	6.1%
13.	75COO	CCP-9140	AMRAAM	.16	.19	8.9%
14.	75XOO	PENDING	GPU-5A	.07	.07	3.3%
15.	76COO	CCP-9140	ASPJ	.03	.04	1.9%
16.	76EOO	CCP-9111	ALR-74	.05	.07	3.3%
17.	AGGREGATE MODIFICATION IMPACT				2.14	100%
18.	F-16A SYSTEM DMMH/FH				10.09	
19.	F-16X MSIP SYSTEM DMMH/FH				12.23	

Unscheduled corrective maintenance only. Excludes TCTO & General ground handling man-hours.

A.2

UNIT MAINTENANCE PERSONNEL

	F-16A				F-16X MSIP		
	OFF	ENL	CIV	Change	OFF	ENL	CIV
Below Depot Maint.	10	557	14	+11	10	568	14
Chief Maint.	3	45	3		3	45	3
Avionics Maint.	0	16	2	+ 3	0	19	2
Field Maintenance	0	1	0		0	1	0
Munitions/Missile	0	2	0		0	2	0
Organizational Maint	0	0	0		0	0	0
Aircraft Gen.Sqdn.	4	243	0	+ 6	4	249	0
Component Repair Sq.	1	105	4	+ 2	1	107	4
Equip. Maint. Sq.	2	144	5		2	144	5

APPENDIX A. UNIT MAINTENANCE PERSONNEL

A.1 General

Total manning for an F-16A squadron is shown, along with anticipated changes as determined by a detailed logistics support analysis . . .

Although the Mean Time to Repair (MTTR) for many of the new subsystems planned for F-16X incorporation will decrease due to increased circuit board commonality, Built-In-Test (BIT) and component redundancy . . ..system reliability (MFHBF) will still decrease in aggregate terms due to the addition of those new systems, resulting in increased manning requirements . . .

GUIDANCE: EXPLAIN THE RATIONALE BEHIND MANNING CHANGES TO THE BASELINE SYSTEM. WHEN THE ALTERNATIVE SYSTEM INCORPORATES NEW CONCEPTS OR A RADICAL DEPARTURE FROM EXISTING SYSTEMS/METHODS, EXPLAIN IN DETAIL THE CHANGE AND ITS EXPECTED IMPACT ON MANNING. THIS EXAMPLE FOCUSES ON THE MAINTENANCE ORGANIZATION. THIS DOES NOT IMPLY THAT THE MANPOWER ISSUE WILL ALWAYS BE MAINTENANCE.

DERIVE MDS SQUADRON MANNING FROM THE APPROPRIATE VAMOSC WSSC MDS OPERATING AND SUPPORT COST REPORT (AR8103). MANNING IS DISPLAYED BY COST ELEMENT. IF FURTHER DETAIL IS REQUI..., OBTAIN AN ITEMIZED BREAKOUT OF SQUADRON MANNING FROM THE TAC LCOM MODEL.

5. SUMMARY

Still to be resolved are the methods of determining second destination transportation, Advanced Flying Training and Other Advanced Training costs. The additional complexity of the F-16X MSIP configuration changes will undoubtedly require additional flight crew and maintenance personnel training. It is anticipated that estimating methods will be developed and values for these cost categories validated in the near future.

GUIDANCE: NOTE ISSUES LEFT UNRESOLVED OR THOSE WHICH WILL RECEIVE CLOSE SCRUTINY IN THE FUTURE.

4.3 POL Sensitivity

There are two areas of risk associated with POL Costs; the uncertainty of JP-4 fuel costs and the fuel consumption of a new system. To place the F-16X MSIP system in the proper perspective, other comparable weapon systems are shown in Figure 4 (Figures are derived from VAMOSC WSSC Operating and Support Cost Reports by MDS for FY83).

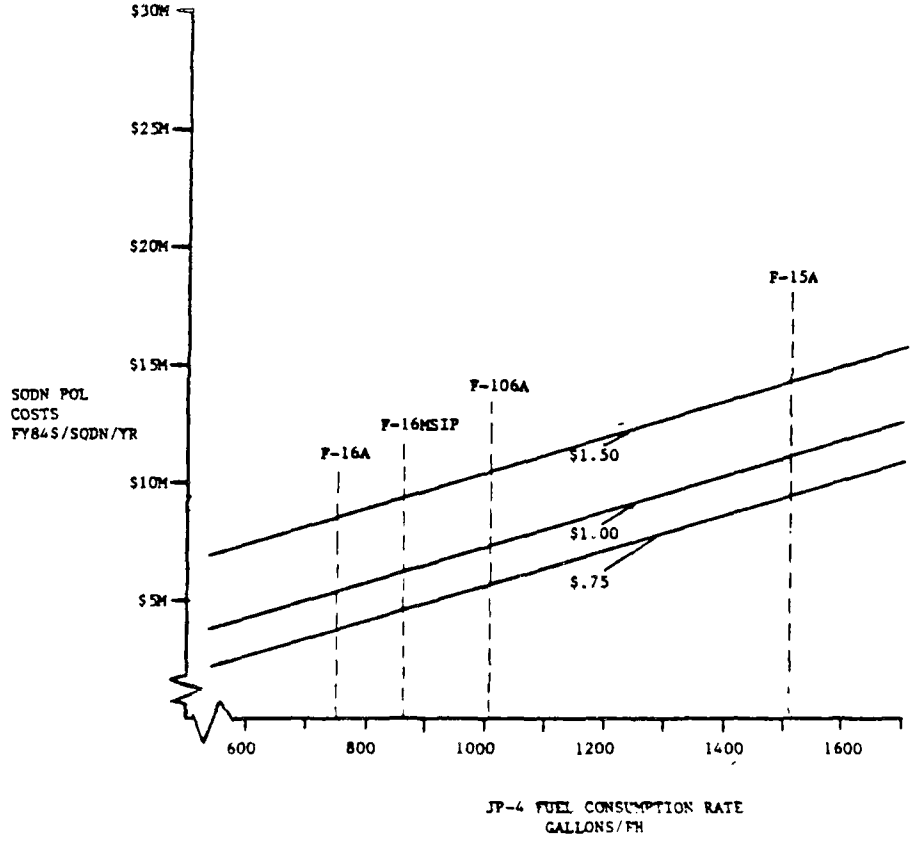


FIGURE 4. POL SENSITIVITY GRAPH

BELOW DEPOT MAINTENANCE

Avionics Maintenance (con't) (Table 3, Line 11)

Contract Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Avionics Manning}}{\text{F-16A Avionics Manning}}$

= .002M x $\frac{19}{16}$

= $.002M/Squadron/year

GUIDANCE: CONTRACT, OTHER, AND P&A COST SHOULD BE SCALED BY THE CHANGE IN MANNING, SINCE THESE COSTS CONSIST PRIMARILY OF LABOR. THE CHANGE IN MANNING IS OBTAINED FROM THE SPO.

Other Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Avionics Manning}}{\text{F-16A Avionics Manning}}$

= $.001M x $\frac{19}{16}$

= $.001M/Squadron/Year

Enlisted P&A Cost = # of Enl. Pers. x Avionics Enlisted Rate

= 19 x $18,355

= $348,745 or $.349M/Squadron/Year

GUIDANCE: DERIVE THE AVERAGE P&A RATE FROM VAMOSC WSSC, BY DIVIDING THE TOTAL P&A COST PER COST ELEMENT BY THE NUMBER OF PERSONNEL. THE REQUIRED DATA IS AVAILABLE IN THE WSSC MDS OPERATING AND SUPPORT COST REPORT (AR8103).

Total Below Depot Avionics Maint. Cost = Materiel + Contract + Other + (Off., Enl. & Civ. P&A Cost)

= $.054 + $.002M + .001M + (.003 + .349 + .016)

= $.425M/Squadron/Year

BELOW DEPOT MAINTENANCE

AIRCRAFT GENERATION SQUADRON (Table 3, Line 15)

Materiel Cost = F-16A WSSC Cost + Summation of MSIP Materiel Cost Impacts. (See Table C-2)

= .922M/Squadron/Year

TABLE C.2

BELOW DEPOT AIRCRAFT GEN. SQ. MATERIEL COST COMPUTATION

WUC	MOD. #	DESCRIPTION	VAMOSC CSCS LIKE/SIMILAR BELOW DEPOT MATERIEL COST	X	RELIABILITY** SCALAR	X	MATERIAL*** SCALAR	X	% MATERIEL CONSUMED AT AIRCRAFT GEN. SQ. MAINTENANCE*	=	CHANGE IN AIRCRAFT GEN. SQ. MAINT. MATERIEL COST
42DEO	0822	Power, PCS	9,580		.72		1.71		40%		4,718
63B00	CCP-9149	JTIDS	13,060		.82		2.24		35%		8,396
63X00	PENDING	EJS	7,460		.67		2.45		35%		4,286
65X00	CCP-9101F	UFCNI IFF	24,880		.63		1.58		35%		8,229
71D00	CCP-9145	GPS	11,920		.81		1.58		35%		5,204
71X00	CCP-9101F	UFCNI NAV	5,961		.69		2.43		35%		3,498
74A00	CCP-9101F	AN/APG-68	87,080		.76		1.38		35%		31,965
74C00	CCP-9101F	EXCAP FCC	43,540		.72		1.90		35%		20,847
74H00	CCP-9101F	DTU	8,710		.70		1.06		35%		2,262
74N00	CCP-9101F	LANTIRN	58,050		.84		2.25		35%		38,059
74W00	CCP-5763	PLSS	31,930		.72		2.28		35%		18,346
74X00	CCP-9101F	ACTU	14,514		.86		1.49		35%		4,762
75C00	CCP-9140	AMRAAM	18,280		.93		2.04		35%		6,188
75X00	PENDING	GPU-5A	34,[illegible]		.96		.92		40%		12,086
76C00	CCP-9140	ASPJ	15,490		.88		1.94		35%		11,646
76Z00	CCP-9111	ALR-74	8,770		.74		1.12		35%		2,544
AGGREGATE MODIFICATION IMPACT											$183,036
F-16A WSSC BASELINE COST (Table 7, Line 15, Column B)											$739,000
F-16X MSIP TOTAL AIRCRAFT GENERATION SQUADRON MATERIEL COST PER YEAR (Table 3, Line 15, Column B)											$922,036
										or	$ .922M

* See Guidance, Page C-2

** From Table 12

*** From Table 13

Contract Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Aircraft Gen. Sq. Manning}}{\text{F-16A Aircraft Gen. Sq. Manning}}$

= \$.027M x $\frac{249}{243}$

= \$.027M x 1.025

= \$.028M/Squadron/Year

AIRCRAFT GENERATION SQUADRON (Con't) (Table 3, Line 15)

Other Costs = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Aircraft Gen. Sq. Manning}}{\text{F-16A Aircraft Gen. Sq. Manning}}$

= \$.090M x $\frac{249}{243}$

= \$.092M/Squadron/Year

Enlisted P&A Cost = # of Enl. Pers. x Aircraft Gen. Sq. Enlisted Rate
= 249 x \$15,461
= \$3,849,789 or \$3.850M/Squadron/Year

Total Below Depot Aircraft Gen. Sq. Cost = Materiel + Contract + Other + (Off., Enl. and Civ. P&A Cost)
= \$ .922M + .028M + .092M + (.106 + 3.850M + .005M)
= \$5.003M/Squadron/Year

COMPONENT REPAIR SQUADRON (Table 3, Line 16)

Materiel Cost = F-16A WSSC Cost + Summation of MSIP Cost Impacts. (See Table C-3)

= .920M/Squadron/Year

TABLE C.3

COMPONENT REPAIR SQ. MATERIEL COST COMPUTATION

WUC	MOD. #	DESCRIPTION	LIKE/SIMILAR BELOW DEPOT MATERIEL COST	x	RELIABILITY** SCALAR	x	MATERIAL*** SCALAR	x	% MATERIEL CONSUMED AT COMP. REPAIR SQ. MAINTENANCE*	=	CHANGE IN COMP. REPAIR SQ. MAINT. MATERIEL COST
442DE0	0822	POWER, PCS	9,580		.72		1.71		60%		7,077
63B00	CCP-9149	JTIDS	13,060		.82		2.24		60%		14,393
63X00	PENDING	ELS	7,460		.67		2.45		60%		7,347
65X00	CCP-9101F	UFCNI IFF	24,880		.63		1.50		60%		14,107
71D00	CCP-9145	GPS	11,920		.81		1.54		60%		8,921
71X00	CCP-9101F	UFCNI NAV	5,961		.69		2.43		60%		5,997
74A00	CCP-9101F	AN/APG-68	87,080		.76		1.38		60%		54,798
74C00	CCP-9101F	EXCAP FCC	43,540		.72		1.90		60%		35,738
74400	CCP-9101F	DTU	8,710		.70		1.06		60%		3,878
74N00	CCP-9101F	LANTIRN	58,050		.84		2.23		60%		65,244
74W00	CCP-5763	PLSS	31,930		.72		2.28		60%		31,450
4X00	CCP-9101F	ACTU	14,514		.86		1.09		60%		8,163
75C00	CCP-9140	AMRAAM	18,280		.93		1.04		60%		10,608
75X00	PENDING	GPU-5A	34,210		.96		.92		60%		18,129
76C00	CCP-9140	ASPJ	19,490		.88		1.94		60%		19,964
76E00	CCP-9111	ALR-74	8,770		.74		1.12		60%		4,361
AGGREGATE MODIFICATION IMPACT											\$310,175
F-16A WSSC BASELINE COST (Table 2, Line 16, Column B)											\$610,000
F-16X MSIP TOTAL COMPONENT REPAIR SQUADRON MATERIEL COST PER YEAR (Table 3, Line 15, Column B)											\$920,175

* See Guidance, Page C-2

** From Table 12

*** From Table 13

or \$.920M/Squadron

INSTALLATION SUPPORT (Table 3, Line 18)

REAL PROPERTY MAINTENANCE (con't) (Table 3, Line 19)

Enlisted P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.409M x 1.02
= $.417M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost Squadron Manning Scalar
= $.342M x 1.02
= $.349M/Squadron/Year

Total Real Property Maint. Cost = Material Cost + Contract Cost + Other Cost + (Off., Enl. and Civ. P&A Cost)
= $.368M + .624M = .439M + (.041M + .417M + .349M)
= $2.228/Squadron/Year

COMMUNICATIONS (Table 3, Line 20)

Materiel Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.043M x 1.02
= $.044M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.028M x 1.02
= $.029M/Squadron/Year

Other Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.051MM x 1.02
= $.052M/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.021M x 1.02
= $.021M/Squadron/Year

Enlisted P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.266M x 1.02
= $.271M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.038M x 1.02
= $.039M/Squadron/Year

Total Communications Cost = Material Cost + Contract Cost + Other Cost + (P&A Cost)
= $.044M + $.029M + $.052M + (.021M + .271M + .039M)
= $.456M/Squadron/Year

INSTALLATION SUPPORT (Table 3, Line 18)

BASE OPERATIONS (Table 3, Line 21)

Materiel Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.343M x 1.02
= $.350M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.286M x 1.02
= $.394M/Squadron/Year

Other Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.146M x 1.02
= $.149M/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.205M x 1.02
= $.209M/Squadron/Year

Enlisted P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $1.230M x 1.02
= $1.255M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.438M x 1.02
= $.447M/Squadron/Year

Total
Base Operations Cost = Material Cost + Contract Cost + Other Cost + (P&A Cost)
= $.350M + $.394M + $.149M + ($.209M + $1.255M + $.447M)
= $2.804M/Squadron/Year

REPLACEMENT SPARES (Table 3, Line 23)

Replacement Spares Cost
= F-16A WSSC Cost + Summation of MSIP Replacement Spares Cost Impacts. (See Table C-4)
= $1.113M/Squadron/Year

BELOW DEPOT MAINTENANCE

COMPONENT REPAIR SQUADRON (con't) (Table 3, Line 16)

Contract Cost = F-16A WSSC Cost x $\frac{\text{F-16C MSIP Comp. Rpr. Sq. Manning}}{\text{F-16A Comp. Rpr. Sq. Manning}}$

= \$.028M x $\frac{107}{105}$

= \$.028M x \$1.019

= \$.029M/Squadron/Year

Other Cost = F-16A WSSC Cost x $\frac{\text{F-16C MSIP Comp. Rpr. Sq. Manning}}{\text{F-16A Comp. Rpr Sq. Manning}}$

= \$.148M x $\frac{107}{105}$

= \$.148M x 1.019

= \$.151M/Squadron/Year

Enlisted P&A Cost = # of Enl. Pers. x Comp Rpr. Sq. Enlisted Rate

= 107 x \$15,667

= \$1,676,369 or \$1.676M/Squadron/Year

Total Below Depot Comp. Rpr. Sq. Cost = Materiel + Contract + Other + (Off., Enl. and Civ. P&A Cost)

= \$ .920M + .029M + .151M + (.045M + 1.676M + .075M)

= \$2.896M/Squadron/Year

INSTALLATION SUPPORT (Table 3, Line 18)

REAL PROPERTY MAINTENANCE (Table 3, Line 19)

Materiel Cost = F-16A WSSC Cost x Squadron Manning Scalar

= \$.351 x F-16X MSIP Manning/F-16A MSIP Manning

= \$.351 x (724/713)

= \$.351 x 1.02

= \$.358M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Squadron Manning Scalar

= \$.612M x 1.02

= \$.624M/Squadron/Year

Other Cost = F-16A WSSC Cost x Squadron Manning Scalar

= \$.430 x 1.02

= \$.439M/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Squadron Manning Scalar

= \$.040M x 1.02

= \$.041M/Squadron/Year

TABLE C.4
REPLACEMENT SPARES COST COMPUTATION

WUC	MOD. #	DESCRIPTION	VAMOSC CSCS LIKE/SIMILAR REPLACEMENT SPARES COST	X	RELIABILITY** SCALAR	X	MATERIEL*** SCALAR	=	CHANGE IN REPLACEMENT SPARES COST
42D80	0822	Power, PCS	4,120		.72		1.71		$ 5,073
63B00	CCP-9149	JTIDS	5,610		.82		2.24		$ 10,304
63X00	PENDING	EJS	3,210		.67		2.45		$ 5,269
65X00	CCP-9101F	UFCNI IFF	10,690		.63		1.50		$ 10,102
71D00	CCP-9145	GPS	5,120		.81		1.54		$ 6,387
71X00	CCP-9101F	UFCNI NAV	2,230		.69		2.43		$ 3,739
74A00	CCP-9101F	AN/ARG-68	37,410		.76		1.38		$ 39,236
74C00	CCP-9101F	EXCAP FCC	18,710		.72		1.90		$ 25,595
74H00	CCP-9101F	DTU	3,740		.70		1.06		$ 2,775
74N00	CCP-9101F	LANTIRN	24,940		.84		2.23		$ 46,718
74W00	CCP-5763	PLSS	13,720		.72		2.28		$ 22,523
74X00	CCP-9101F	ACIU	6,240		.86		1.09		$ 5,849
75C00	CCP-9140	AMRAAM	7,840		.93		1.04		$ 7,583
75X00	PENDING	GPU-5A	14,700		.96		.92		$ 12,983
76C00	CCP-9140	ASPJ	8,370		.88		1.94		$ 14,289
76E00	CCP-9111	ALR-74	3,770		.74		1.12		$ 3,125
AGGREGATE MODIFICATION IMPACT									$ 221,550
F-16A WSSC BASELINE COST (Table 2, Line 23, Column B)									$ 891,000
F-16X MSIP REPLACEMENT SPARES COST PER YEAR (Table 4, Line 23, Column B)									$1,112,550
								or	$1.113M/Squadron

** From Table 12

*** From Table 13

DEPOT MAINTENANCE (Table 3, Line 26)

AVIONICS MAINTENANCE (Table 3, Line 29)

Materiel Cost = F-16A WSSC Cost + Summation of MSIP Avionics Materiel Cost Impacts. (See Table C-5)
= $.081M/Squadron/Year

TABLE C.5
DEPOT AVIONICS MAINTENANCE MATERIAL COST COMPUTATION

WUC	MOD. #	DESCRIPTION	VAMOSC CSCS LIKE/SIMILAR DEPOT AVIONICS MAINT. MATERIEL COST	X	RELIABILITY** SCALAR	X	MATERIEL*** SCALAR	=	CHANGE IN DEPOT AVIONICS MAINT. MATERIEL COST
63B00	CCP-9149	JTIDS	1,640		.82		2.24		3,012
63X00	PENDING	EJS	930		.67		2.45		1,527
65X00	CCP-9101F	UFCNI IFF	3,110		.63		1.50		2,939
71D00	CCP-9145	GPS	1,490		.81		1.54		1,859
71X00	CCP-9101F	UFCNI NAV	650		.69		2.43		1,090
74A00	CCP-9101F	AN/APG-68	10,900		.76		1.38		11,432
74C00	CCP-9101F	EXCAP FCC	5,450		.72		1.90		7,456
74H00	CCP-9101F	DTU	1,090		.70		1.06		809
74N00	CCP-9101F	LANTIRN	7,270		.84		2.23		13,618
74W0D	CCP-5763	PLSS	4,000		.72		2.28		6,566
74X00	CCP-9101F	ACIU	1,820		.86		1.09		1,706
75C00	CCP-9140	AMRAAM	2,280		.93		1.04		2,205
76C00	CCP-9142	ASPJ	2,440		.88		1.94		4,166
76E00	CCP-9111	ALR-74	1,100		.74		1.12		912
AGGREGATE MODIFICATION IMPACT									$59,297
F-16A WSSC BASELINE COST (Table 2, Line 28, Column 8)									$22,000
F-16X MSIP DEPOT AVIONICS MAINTENANCE MATERIEL COST PER SQUADRON									$81,297/Squadron
									or $.081M/Squadron

** From Table 12
*** From Table 13

Contract Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Avionics Maint.Mat}}{\text{F-16A Depot Avionics Maint.,Mat.}}$

= $.066M x $\frac{\$81,297}{\$22,000}$

= $.244M/Squadron/Year

Other Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Avionics Maint.Mat}}{\text{F-16A Depot Avionics Maint.Materiel}}$

= $.028M x $\frac{\$81,297}{\$22,000}$

= $.103M/Squadron/Year

DEPOT MAINTENANCE (Table 3, Line 26)

AVIONICS MAINTENANCE (Con't) (Table 3, Line 29)

Civilian P&A =F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Avionics Maint.Mat}}{\text{F-16A Depot Avionics Maint.Materiel}}$

= \$.030M x $\frac{\$81,297}{\$22,000}$

= \$.111M/Squadron/Year

Total Depot Avionics Maint. Cost = Materiel + Contract + Other + (P&A Cost)

= \$.081M + \$.244M + \$.103M + (\$.111M

= \$.539M/Squadron/Year

OTHER MAINTENANCE (Table 3, Line 30)

Materiel Cost = F-16A WSSC Cost + Summation of Depot MSIP Non-Engine/ Avionics Materiel Cost Impacts.

= \$.102M/Squadron/Year

TABLE C.6
NON-AVIONICS MAINTENANCE MATERIEL COST COMPUTATION

WUC	MOD. #	DESCRIPTION	VAMOSC CSCS DEPOT MATERIEL COST	X	RELIABILITY SCALAR	X	MAT. SCALAR	=	CHANGE IN OTHER DEPOT MAINT. MAT. COST
42DE0	0822	Power, FCS	1,200		.72		1.71		1,477
75X00	PENDING	GPU-5A	6,220		.96		.92		5,494
AGGREGATE MODIFICATION IMPACT									6,971
F-16A WSSC BASELINE COST (Table 2, Line 30, Column B)									95,000
F-16X MSIP DEPOT OTHER MAINTENANCE MATERIEL COST									= \$101,971 or \$.102M/Sq.

Contract Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Other Maint.Mat.}}{\text{F-16A Depot Other Maint. Materiel}}$

= \$.071M x $\frac{\$101,971}{\$\ 95,000}$

= \$.076M/Squadron/Year

DEPOT MAINTENANCE (Table 3, Line 26)

OTHER MAINTENANCE (con't) (Table 3, Line 30)

Other Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Other Maint.Mat.}}{\text{F-16A Depot Other Maint. Materiel}}$

= \$.046M x $\frac{\$101,971}{\$\ 95,000}$

= \$.049M/Squadron/Year

Civ.P&A Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Other Maint.Mat}}{\text{F-16A Depot Other Maintenance Mat}}$

= \$.050M x $\frac{\$101,971}{\$\ 95,000}$

= \$.054M/Squadron/Year

Total Depot Other Maint. Cost = Materiel + Contract + Other + (P&A Cost)

= \$.102M + \$.076M + \$.049M + \$.054M

= \$.28M/Squadron/Year

GENERAL DEPOT SUPPORT (Table 3, Line 31)

Materiel Cost = F-16A WSSC Cost x $\frac{\text{F-16X MSIP Depot Maint. Cost}}{\text{F-16A Depot Maintenance Cost}}$

= \$.047M x $\frac{\$3.982}{\$3.570}$

= \$.047M x 1.11

= \$.052M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar

= \$.092M x 1.11

= \$.102M/Squadron/Year

Other Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar

= \$.025M x 1.11

= \$.028M/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar

= \$.031M x 1.11

= \$.034M/Squadron/Year

GENERAL DEPOT SUPPORT (Table 3, Line 31)

Enlisted P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.016M x 1.11
= $.018M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.818 x 1.11
= $.908M/Squadron/Year

Total General Depot Support Cost = Materiel Cost + Contract Cost + Other Cost + (P&A Cost)
= $.052M + $.102M + $.028M + ($.034M + $.018M + $.908M)
= $1.142M/Squadron/Year

DEPOT INSTALLATION SUPPORT (Table 3, Line 32)

REAL PROPERTY MAINTENANCE (Table 3, Line 33)

Materiel Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $013 x 1.11
= $.014M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.071M x 1.11
= $.079M/Squadron/Year

Other Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.012 x 1.11
= $.013/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.001M x 1.11
= $.001M/Squadron/Year

Enlisted P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.017M x 1.11
= $.019M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.051M x 1.11
= $.057M/Squadron/Year

DEPOT INSTALLATION SUPPORT (Table 3, Line 32)

REAL PROPERTY MAINTENANCE (con't) (Table 3, Line 33)

Total Real Property Maintenance Cost = Materiel Cost + Contract Cost + Other Cost + (P&A Cost)
= $.014M + $.079M + $.013M + ($.001M + $.019M + $.057M)
= $.183M/Squadron/Year

COMMUNICATIONS (Table 3, Line 34)

Materiel Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.001M x 1.11
= $.001M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.000M x 1.11
= $.000M/Squadron/Year

Other Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.009M x 1.11
= $.010M/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.003M x 1.11
= $.003M/Squadron/Year

Enlisted P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.008M x 1.11
= $.009M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.009M x 1.11
= $.010M/Squadron/Year

Total Communications Cost = Materiel Cost + Contract Cost + Other Cost + (P&A Cost)
= $.001M + $.000M + $.010M + ($.003M + $.009M + $010M)
= $.033M/Squadron/Year

DEPOT INSTALLATION SUPPORT (Table 3, Line 32)

BASE OPERATIONS (Table 3, Line 35)

Materiel Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.011M x 1.11
= $.012M/Squadron/Year

Contract Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.013M x 1.11
= $.014M/Squadron/Year

Other Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.006M x 1.11
= $.007M/Squadron/Year

Officer P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.015M x 1.11
= $.017M/Squadron/Year

Enlisted P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.030M x 1.11
= $.033M/Squadron/Year

Civilian P&A Cost = F-16A WSSC Cost x Depot Maint. Cost Scalar
= $.083M x 1.11
= $.092M/Squadron/Year

Total Base Operations Cost = Materiel Cost + Contract Cost + Other Cost + (P&A Cost)
= $.012M + $.014M + $.007M + ($.017M + $.033M + $.092M)
= $.175M/Squadron/Year

MEDICAL CARE (Table 3, Line 36)

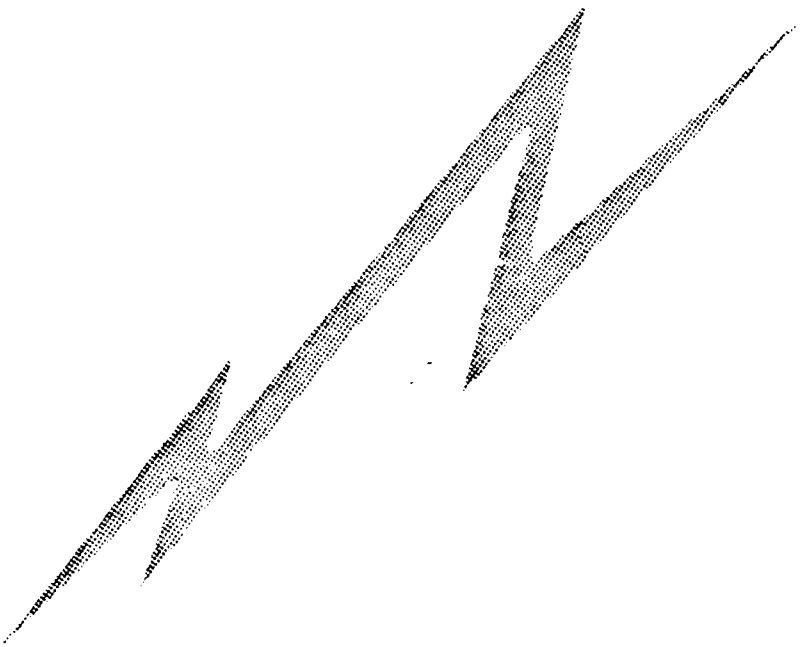
Medical Care = F-16A WSSC Cost x Squadron Manning Scalar
= $.559M x 1.02
= $.570M/Squadron/Year

PCS (Table 3, Line 37)

Officer PCS Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.204 x 1.02
= $.208M/Squadron/Year

Enlisted PCS Cost = F-16A WSSC Cost x Squadron Manning Scalar
= $.335 x 1.02
= $.342M/Squadron/Year

Total PCS Cost = Officer PCS + Enlisted PCS
= $.208M + $.342M
= $.550M/Squadron/Year



APPENDIX D. SIGNIFICANT MODIFICATION IMPACT COMPUTATIONS

GUIDANCE: PRESENT THE MATHEMATICAL EQUATIONS USED TO CALCULATE THE O&S COST IMPACT OF EACH MODIFICATION. IT IS NOT NECESSARY TO PRESENT EVERY CALCULATION FOR EACH MODIFICATION, SINCE IN MANY CASES THIS WOULD REPEAT DATA ALREADY PRESENTED IN APPENDIX C.

EACH CALCULATION SHOULD BE EASILY REPRODUCIBLE. HENCE, PROVIDE A LOCATOR REFERENCE IN PARENTHESIS AFTER EACH EQUATION.

POL = % Change Attributable to Modification (Engineering Estimate, Section 3.5) x Total Change in POL costs (Table 3, line 7 - Table 2, Line 7)

Below Depot Maintenance = Materiel Cost + Contract Cost + Other Cost + P&A cost.

Materiel Cost = Summation of Below Depot Individual Modification Materiel Cost from Appendix C, Including Avionics Maintenance, (Table C-1) Aircraft Generation Squadron (Table C-2) + Component Repair Squadron (Table C-3) functions.

Contract Cost = $\frac{\text{Modification DMMH/FH (Appendix A, Table A-1)}}{\text{Total Change DMMH/FH (Appendix A, Table A-1)}}$ x Total Change in Contract Cost (Table 3, Line 9, Column C)

Other Cost = $\frac{\text{Modification DMMH/FH (Appendix A, Table A-1)}}{\text{Total Change DMMH/FH (Appendix A, Table A-1)}}$ x Total Change in Other Cost (Table 3, Line 9, Column D Table 2, Line 9 Column D)

P&A Cost = $\frac{\text{Modification DMMH/FH (Appendix A, Table A-1)}}{\text{Total Change DMMH/FH (Appendix A, Table A-1)}}$ x Total Change in P&A Cost (Table 3, Line 9, Column E, F&G Table 2, Line 9, Column E, F&G)

Installation Support = $\frac{\text{Modification DMMH/FH (Appendix A, Table A-1)}}{\text{Total Change DMMH/FM (Appendix A, Table A-1)}}$ x Total Change in Installation Support (Table 3, Line 18-Table 2, Line 18)

Replacement Spares	=	Cost by Modification from Appendix C, Table C-4.
Depot Maintenance	=	Materiel Cost + Contract Cost + Other Cost + P&A cost
Materiel Cost	=	Depot Individual Modification Materiel cost as Derived in Table C-5 and C-6.
Contract Cost	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-1)
	x	Total Change in Contract Cost (Table 3, Line 26, Column C - Table 2, Line 26, Column C)
Other Cost	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-1)
	x	Total Change in Other Cost (Table 3, Line 26, Column D - Table 2, Line 26 Column D)
P&A Cost	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-
	x	Total Change in P&A cost (Table 31 Line 2 , Column E, F&G-Table 2, Line 26, Column E, F&G)
General Depot Support	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-1)
	x	Total Change in General Depot Support (Table 3, Line 31 - Table 2, Line 31)
Depot Installation Support	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-1)
	x	Total Change in Depot Installation Support (Table 3, Line 32 - Table 2, Line 32)
Medical Care	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-1)
	x	Total Change in Medical Care (Table 3, Line 36 - Table 2, Line 36)
PCS	=	Modification DMMH/FH (Appendix A, Table A-1) / Total Change DMMH/FH (Appendix A, Table A-1)
	x	Total Change in PCS (Table 3, Line 37 - Table 2, Line 37)

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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. 3. RECIPIENT'S CATALOG NUMBER
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18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

VAMOSC
O&S COSTS
COST ESTIMATES

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This case example of a hypothetical F-16X aircraft Operating and Support (O&S) cost estimate, sponsored by AFLC/MM (VAMOSC), has been prepared to demonstrate and test the capability of the Air Force Visibility and Management of Operating and Support Costs (VAMOSC II) system to provide unique and detailed experience data suitable for credible and explicit O&S cost estimation for advanced Air Force aircraft systems and subsystems.

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The specific objective of this effort was:

- o To produce a case example of VAMOSC II applicability to O&S cost estimation which conforms to the following conditions:
  - Is compatible with OSD/CAIG and USAF costing guidance.
  - Is linkable to reported experience data for existing aircraft.
  - Provided a VAMOSC-Supported Methodology which can be utilized to predict the impact of configuration changes on system O&S costs.
  - Depicts a methodology which is applicable to O&S costing for any aircraft system in advanced conceptual development.
  - Provides estimates which are verifiable by tests.
  - Identifies areas of VAMOSC requiring enhancement or modification to improve system integrity and applicability.

The estimate of the hypothetical F-16X MSIP aircraft developed by this research effort is not intended to reflect an actual projection of that aircraft system's O&S cost. Such a projection would require direct engineering support and analysis, including an engineering-oriented interpretation of each candidate design change from the benchmark system (F-16A), and specific review of data provided in VAMOSC II reports and their feeder systems. Therefore, the cost factors and estimates should be taken as indicators of how estimates can be prepared and reported, and should not be presumed to be valid estimates for any F-16 MSIP variant aircraft.

This case example will assist the cost analyst in the preparation of cost estimating reports submitted to the AFSARC and the Office of the Secretary of Defense/Cost Analysis Improvement Group (OSD/CAIG). The estimate has been developed and documented to be totally consistent with the format in the guidance issued by the CAIG for system proceeding into the Milestone I phase of systems acquisition.

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